# A Performance Audit of
# The
# Utah Department of Environmental Quality

## Chapter I
## Introduction

The Utah Department of Environmental Quality (DEQ) is achieving its assigned task of protecting public health and safety through its commercial waste disposal programs. Both radioactive and hazardous wastes are being disposed of in landfill operations that meet the/ current standards for such operations. However, the Department's activities are not without problems. Statutory wording in **Utah Code** 19-1-102 calls for safeguarding public health and quality of life from the effects waste disposal while considering the impact of economic development. This legislative intent statement requires a balancing of protecting the public and working with industry, DEQ management sets policy when it sets this balance point. In turn, some conflict has resulted within DEQ as to where the balance should be. The extent of this conflict suggests that establishing specific waste disposal policies at either the divisional board or legislative level would be beneficial.

### Utah Has an Active Commercial Waste Disposal Industry

The need for specialized waste disposal has increased dramatically in this country as more toxic and dangerous materials are utilized. Nationally, toxic wastes have been separated into two basic categories: hazardous wastes which are of a chemical nature and radioactive wastes from nuclear related industries. Utah has commercial waste disposal for both basic types of toxic wastes. Commercial waste disposal has evolved into a highly competitive field, a fact contributing to problems in addressing this industry's regulation.

Handling and disposing of toxic wastes is a national problem that is being addressed by the federal government. For hazardous (chemical) wastes the federal lead agency is the Environmental Protection Agency (EPA). For radioactive wastes, the lead role has been given to the Nuclear Regulatory Commission (NRC). Both federal agencies have developed regulations to control their respective wastes and have initiated state agreement programs to solicit action and participation in the control of these wastes. In addition, the NRC is charged with directing the Low-level Waste Energy Act, which contains a program for states to join in compacts to address their needs in nuclear waste control.

Utah participates in both EPA and NRC programs and is also a member of the Northwest Compact, established to control low-level radioactive wastes. The state has a number of commercial operators under license or permit disposing of a variety of regulated wastes. Further, Utah has one major landfill operator primarily disposing of EPA-regulated wastes governed by the Resource Conservation and Recovery Act (RCRA) under a state permit. That operator and one other are in the process of constructing waste incinerators that will be permitted to incinerate wastes no longer deemed appropriate for landfill. Another operator is licensed to dispose of various types of low-level radioactive wastes in landfills and is also

permitted to dispose of mixed chemical and radioactive wastes, also in landfills. Another major commercial operator with a solid waste permit will apparently have a landfill operation allowed to dispose of toxic wastes exempted from the RCRA list of hazardous wastes.

Each waste type or waste stream has unique characteristics requiring different disposal methods and hence different disposal regulations, as between hazardous chemicals and radioactive wastes. Hazardous wastes placed in landfills require methods that prevent leakage into surrounding soils and groundwater. This calls for control of downward flow of the wastes with multiple liners and collection systems beneath the waste. Incineration is called for when the chemical components are extremely toxic and difficult to treat or stabilize.

The NRC, believing that total containment over hundreds of years is not feasible, imposes waste control and facility design requirements that limit the releases of radiation into the atmosphere and ground water to predetermined, acceptable levels. Key to the NRC's containment theory is the use of natural materials as the protective barrier. Radioactive material is classified as either high-level or low-level material with a variety of subclassifications under each general area. Each classification has its own set of regulations depending upon the type or kind of waste and its uniqueness. Utah currently only licenses disposal of low-level bulk materials below a certain radioactive concentration level.

The volume and the specialized needs in disposal of hazardous and radioactive wastes have made the business of waste disposal very lucrative. This earnings potential has resulted in strong competition and, in some cases, corporate warfare in vying for large contracts. Such potential is, in part, responsible for the initiation of this audit because some sources allege that Utah's regulatory programs have stepped into the competitive arena. Businesses outside Utah feel that the state's regulatory programs have embraced economic development and the state is no longer a neutral party at a time when other states are attempting to prevent disposal development in their boundaries. The allegation is that Utah goes too far in supporting its waste disposal facilities and their development, but not that Utah is violating its charge to protect public health. Envirocare denies that DEQ is going too far to support industry.

## Department Protects Public Safety and Health

Part of the reason for the creation of the Utah DEQ is to monitor waste disposal regulations in a way that protects public health and safety from the effects of hazardous and radioactive wastes. This protection has evolved from a complex network of federal and state regulations and regulators. The focal points of the regulations are the state-issued licenses and permits that outline operating parameters for facilities by incorporating state and federal regulations for waste disposal. These agreements between the state and commercial operators outline the regulations that must be followed and detail compliance programs to assure the regulations are followed.

State and federal programs form a complex network of regulations and regulators, each with different agendas. While the state attempts to balance its program to protect industry within the state, federal regulators have a more rigid regulatory approach that does not take economic development of the individual state into account. Federal regulations and programs do change, however, as research develops new technologies and philosophies. For example, the EPA will introduce new regulations and programs that only they have jurisdiction over. These programs are turned over to the state after the state complies with the new rules. The NRC behaves in much the same way, maintaining control over some areas until the individual state can show competence in the area of concern.

License and permit agreements with disposal facilities have both state and federal components. The state is the lead agency in any licensing action once it has been given authority by the governing federal agency. Licenses and permits are agreements between the state and the facility operator, but federal control is still significant. This control exists because the agreement between the state and the federal agency usually requires the state to adopt federal regulations as the operating foundation of its program; therefore, federal regulations are a major portion of any state license or permit. Also, federal officials conduct regular reviews of Utah's compliance with federal statutes and regulations.

Enforcement of the licenses and permits comes from well delineated compliance programs set out in the federal-state agreements. Compliance programs are meant to assure license stipulations are followed and that staff for review and analysis of facility operations are present. Once a license or permit is signed, the compliance staff takes the lead in the enforcement of state and federal regulations for the protection of public health.

## Department Mission to Aid Industry Adds a Complicating Factor

Utah's regulation and control of its commercial waste disposal industry is complicated because statute mandates the department balance public health and safety with economic development. This is a problem because it pits compliance staff, with a strong leaning toward strict procedural compliance, against management who must follow the statutory mandate of balancing regulatory responsibility with economic development of the industry. Management decisions, at times, appear to staff as compromising the department's commitment to protecting public health. Staff told us that they were never asked to do anything to compromise public safety but have been asked to perform tasks that do not seem procedurally correct. Staff stated that some DRC license amendments were issued simply because the licensee's operations could not comply with the existing wording of the license. An example of this concern is the amendment allowing an increase in uncovered radioactive material. The low radioactive concentrations of the material and the remoteness of the site prevent risk to the general public but greater amounts imply greater exposure risk . A result of the greater uncovered volume was DRC's requirement to also increase the surety trust amount.

Staff also stated that they, at times, found it necessary to write sections of reports for a licensee to speed up the application process because, in staff's opinion, the licensee lacked the expertise. Envirocare disagrees with this opinion.

While federal agencies deal directly with regulations for the protection of the public and the environment, the DEQ must deal with the application of the regulation where factors other than the protection of the public and the environment must be considered. Utah statute clearly calls on the department to mitigate its protection responsibilities with other state needs and desires. **Utah Code** 19-1-102 is DEQ's purpose statement and reads:

> *The purpose of this title is to :*
>
> *(1) clarify the powers and duties of the Department of Environmental Quality in relationship to local health departments;*
>
> *(2) provide effective, coordinated management of state environmental concerns:*
>
> *(3)* ***safeguard public health and quality of life by protecting and improving environmental quality while considering the benefits to public health, the impacts on economic development, property, wildlife, tourism, business, agriculture, forests, and other interests, and the costs to the public and to industry****: and*
>
> *(4) (a) strengthen local health departments' environmental programs:*
>
> *(b) build consensus among the public, industry, and local governments in developing environmental protection goals: and*
>
> *(c)* ***appropriately balance the need for environmental protection with the need for economic and industrial development.***
>
> (Emphasis added)

According to DEQ management, they believe they have been given this task of balancing protection and development. The task of the department's compliance staff has been to focus on the enforcement of regulations, which does not include balancing public protection and development: the facility either does or does not comply with the regulations encompassed by its license or permit. If the facility does not comply it is endangering the public. The staff assumption that compliance is the most important element of their work creates some of the disagreements and conflicts faced by the department.

Some management actions have fueled disagreements because the compliance staff has thought that either management decisions have reduced public protection or have unfairly aided a single facility. Greater clarity appears to be called for, possibly by more actively involving the department's appointed boards in key decisions or through legislative action to better focus

departmental objectives.

## Audit Scope and Objectives

This audit was requested by Representatives Kelly Atkinson, Frank Pignanelli, and David Adams. The original request contained 11 concerns about the behavior and operations of the DEQ in its dealings with Utah's sole commercial radioactive waste disposal facility. We address these specific concerns in Chapter II of this report. We also conducted a more extensive review of DEQ commercial waste disposal regulations and controls. Our review did not extend to the operation of the entire department nor did we review any waste generator programs. Primarily, our work involved the Division of Radiation Control (DRC), the Division of Solid and Hazardous Waste (DSHW), and to a lesser extent the Division of Water Quality (DWQ). Much of our work involved direct contact with the commercial waste disposal businesses operating in Utah and other states. Because of the technical nature of the programs under review, we hired the services of Dale Smith Consulting. Mr. Smith is a retired NRC administrator with a respected background in radiation control; his report is included in its entirety in Appendix A.

The objectives of the audit were to address the listed concerns and to review the DEQ's regulatory control over commercial waste disposal facilities. After surveying DEQ's operations, our focus became the actual licensing process and the department's license compliance efforts. Our work is not intended to be a review of private business operations.

The following chapters discuss legislator's concerns as well as DEQ's ability to protect public health through its licensing and compliance programs; DEQ's conflicting mission statement; DEQ's use of license amendments and conditional permits; the possible need to establish clear waste industry policies for the state; and other questions affecting DEQ's operations. Because of the technical nature of this audit, we have also included a number of appendices to aid in clarification. Appendix F contains definitions applicable to this report.

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# Chapter II
# Legislator Questions

Accompanying the audit request from Representatives Kelly Atkinson, Frank Pignanelli, and David Adams were 11 specific questions pertaining to DEQ licensing, regulatory oversight, and disposal operations at Envirocare. The emphasis of this audit was to address the 11 questions within the framework of the DEQ's statutory responsibilities. This chapter attempts to answer the questions directly, but much of the information gathered is technical and does not lend itself to short answers. Many of the questions raised in the audit request are covered in greater depth in the latter chapters of this report. Where needed, the reader is referred to the appropriate chapter for a complete analysis of the issue.

### (1) Is the Utah Bureau of Radiation Control administering a regulatory program which adequately protects the public safety and well-being of Utah's citizenry?

Chapter III examines in depth DEQ and DRC efforts to protect public safety. In summary, we found that DRC's regulatory program is based on NRC guidelines that form the national standard for radioactive waste disposal. Through an agreement with NRC, the State of Utah committed to follow NRC guidelines. The agreement authorizes the state to administer its own radiation control program. NRC has conducted four audits of the state's radiation control program. Overall, the audits have confirmed that the state's program is in compliance with NRC guidelines. In addition, NRC conducted an extensive review of DRC's licensing of Envirocare. With the exception of the land ownership exemption issue and the conditional permit issues discussed in Chapter IV, NRC's review of DRC's licensing of Envirocare was positive. We asked Dale Smith Consulting to review the state's radiation control program to determine whether DRC was administering a regulatory program adequate to protect public health and safety. Dale Smith Consulting concluded that the conditions of the license issued to Envirocare were basically adequate to protect public health, safety, and the environment.

### (2) Is the BRC's monitoring program adequately compelling Envirocare to meet all regulations as established by the Utah State Legislature and the regulations of the NRC?

DRC's monitoring program is also discussed in detail in Chapter III. In summary, DRC has established a compliance inspection program to ensure that disposal operations at Envirocare comply with the requirements of the license. Envirocare's license is based on the provisions contained in NRC Part-61 guidelines. The license serves as the basis for DRC's

regulatory control. Compliance inspections consist of daily inspection of operations, periodic inspection of records, and regularly scheduled environmental testing to confirm the results of Envirocare's environmental monitoring. If non-compliance is found in any area, a notice of violation (NOV) is issued to Envirocare. Dale Smith Consulting reported that the 47 NOVs issued to Envirocare over a 43-month period are an unusually high number, but that Envirocare has shown improvement in the last few years. Much of this number can be explained by the aggressive compliance program operated by the state in the early years of Envirocare's operation.

In order to test DRC's compliance inspection program, we assisted a DRC inspector in performing a random sample of 24 shipping manifests and associated generator's waste characterizations from waste shipments received at Envirocare. We asked Dale Smith Consulting to analyze the manifests and waste characterizations to determine whether the concentrations fell within the limits of the license, whether the generator's waste characterization appeared accurate, and whether the waste shipped to Envirocare appeared typical or normal for the generator's industry. Dale Smith Consulting concluded that, with the exception of material received from Rhone-Poulenc, all shipments appeared to be within the limits of Envirocare's license and that the waste characterizations appeared proper for the various industries.

**Waste from Rhone-Poulenc was not within the limits of Envirocare's license.** Rhone-Poulenc is a Texas-based company that processes rare earth elements from native soils. The extraction of the rare earth elements results in a radioactive waste byproduct classified by the NRC as source material. In 1988, Rhone-Poulenc shipped approximately 400 drums of radioactive waste to Envirocare. However, at that time Envirocare was licensed to only accept and dispose of normally occurring radioactive material (NORM). Naturally, the Rhone-Poulenc issue resulted in a great deal of controversy. Critics charged that Envirocare was accepting illegal material not within the limits of the license. According to DRC officials the state of Texas had improperly classified the Rhone-Poulenc waste as material that could be disposed of in a NORM cell and that the Rhone-Poulenc waste was shipped to Envirocare under the assumption that it was NORM. DRC officials stated that the NRC disputed Texas' NORM classification and re-classified the waste source material after the material had already been shipped to Envirocare. NRC officials confirmed that there was a misunderstanding between their office and Texas over the classification of Rhone-Poulenc waste.

At approximately the same time the Rhone-Poulenc incident occurred, Envirocare applied to DRC for license amendment 10 to allow disposal of NRC-regulated source, byproduct, and special nuclear material. As a result, Envirocare asked DRC if they could store the Rhone-Poulenc waste at the site until the license could be amended to allow storage of the source material. In a letter to Envirocare, the Director of DRC pointed out the risk associated with storing waste at an unlicensed facility and instructed Envirocare to explain the risks to Rhone-Poulenc. The letter reads, "*I believe it is in Envirocare's and its client's best interest, to explain fully the risks involved in receiving wastes for storage which may never be approved for disposal.*"

According to ex-Envirocare employees, Envirocare buried some of the Rhone-Poulenc waste in a pit and covered it with dirt. They are concerned because some of the drums were opened when the waste arrived at Envirocare and they believe loose waste in the storage pit may be in contact with native soil. Envirocare reported that the material was removed from the lifts in the NORM disposal cell and covered in a segregated portion of the cell awaiting final determination. DRC believes the waste was placed in storage containers on a controlled pad and the crushed barrels and lids were temporarily buried in a non-approved pit. DRC inspectors were not present when Envirocare removed the waste from the NORM cell; therefore, they are uncertain whether loose waste was placed in the pit or containers.

After much discussion, DRC decided to allow Envirocare to store the Rhone-Poulenc waste based upon conditions outlined in an authorization letter dated November 7, 1990 as follows: (1) the wastes were to be kept in easily identified segregated storage from other materials, (2) unpackaged waste were to be covered, as necessary, to prevent the potential loss of contaminants by weathering, (3) if, within one year from receipt, the wastes were not disposed of, they were to be returned to Rhone-Poulenc or sent to a commercial waste disposal facility, and (4) funds were to be available to comply with item (3), above.

We asked Dale Smith Consulting to review the manifests and waste characterizations from Rhone-Poulenc to determine whether Envirocare should have known prior to the waste being shipped: (a) that the Rhone-Poulenc waste was not NORM, (b) that the waste was NRC regulated source material, and (c) whether the shipping manifests and waste characterization show concentration levels above the limits of the NORM license. Dale Smith Consulting concluded:

> *Information provided for shipments of waste from Rhone-Poulenc show that the waste contains uranium and thorium. This waste is "source material" as defined by the Nuclear Regulatory Commission and the State of Utah. The Envirocare license did not permit the receipt and disposal of source material at the time the waste was received. Measurements of incoming shipments from Rhone-Poulenc should have established the presence of uranium and thorium.*
>
> *Manifests for the Rhone-Poulenc waste show concentrations of radium-226 to be 6,500 pCi/g for 16 drums of waste. This is in excess of the 2,000 pCi/g license limit. Thorium-232 concentrations are in excess of the current license disposal limits.*

In our opinion, there are two issues relating to the Rhone-Poulenc situation that remain unanswered at this time. First, why was the Rhone-Poulenc waste shipped to Envirocare in the first place? As stated by Dale Smith Consulting, Envirocare should have been able to determine that the waste was not NORM and that the concentration levels were above the limits of the NORM license based on the waste characterization sent to Envirocare by Rhone-Poulenc prior to the waste being shipped. Second, why didn't DRC enforce compliance action on this matter? It is unclear why DRC did not require Envirocare to return the waste to

Rhone-Poulenc or ship it to an approved facility, since the temporary storage authorization has expired. DRC allowed the Rhone-Poulenc material, with the highest concentration level

of any waste at the site, to be stored at the site for over two years. This method of storage seems to contradict the logic and premise behind state and NRC regulations and requirements for land disposal of radioactive waste.

We have been advised by DEQ management that the material outside the license has recently been returned to Rhone-Poulenc and the remaining waste has been disposed of in the proper waste cell. The temporary storage authorization granted by DRC in November of 1990 expired over one year ago and Envirocare's license has since been amended to allow disposal of NRC-regulated source material. Other questions involving waste streams and waste characterizations that allow mixing of wastes at the point of origin have evolved from this case. Discussions with the parties involved indicate that these questions are of perspective. The current license and NRC directives allow a great deal of interpretation in determination of waste streams and characterizations. There is little policy directive either federally or from the state to aid in this interpretation.

**Different compliance program perspectives have added to the controversy surrounding Envirocare.** While DRC's compliance inspection program appears to be adequate to ensure the protection of public health, safety, and the environment, the strong regulatory role taken by DRC inspectors tends to present observers with a mixed picture. On one hand, the effectiveness of DRC's compliance program can be documented by the large number of NOVs and penalties issued. On the other hand, this same number of NOVs and penalties issued has been the focus of controversy leading some agency observers to conclude that Envirocare operates outside state and NRC guidelines and further, that DRC's regulatory program is inadequate to compel Envirocare to comply with state and NRC guidelines. Another source of controversy stems from the circulation of several internal memos from DRC inspectors to DRC management and letters from DRC management to Envirocare regarding compliance problems. According to DRC inspectors, most of these communiques and the aggressiveness of the compliance staff on NOVs are the result of attempts to bring Envirocare into conformity during the early stages of operations. They point out that Envirocare is the first radioactive disposal facility licensed within the state and, as a result, there has been a lot of learning and growth on both sides. According to DRC inspectors, Envirocare has shown steady improvement in the compliance area overall.

In order to help the reader understand the controversy surrounding the internal memos and letters to Envirocare, we have reprinted some of them here, followed by an explanation of the events and circumstances in which they were written. The first is a memo from DRC's Environmental Health Manager to the Director of DEQ discussing Envirocare's license amendment request to dispose of NRC regulated waste. The memo, dated May 18, 1990, reads:

> *Considering Envirocare's corporate structure, compliance history and staff, it is clear that there is little commitment to operating the facility in a comprehensive, competent manner. As we have discussed, with one clear exception, there is an inability or unwillingness to attract the management staff necessary to develop, design and implement the facilities programs: likewise, trained and /or*

*experienced staff to perform the daily operations is wanting. The applicant does not possess an in-depth understanding of the regulations, the regulatory process or their license. The applicant has consistently demonstrated that even when an inspection (or other exchange) points out violations or program deficiencies, that Envirocare cannot correct them for the long haul.*

*In summary, under current circumstances, I cannot give a date when I would feel comfortable in amending the license. Furthermore, I don't know what additional assistance the bureau can give or should give, or what the remedies are.*

When asked about this memo, the Environmental Health Manager said he wrote this memo during the time when conflict existed between the Director of DRC and DRC staff (discussed in Chapter IV) over whether an NRC Part-61 review was required to amend Envirocare's license. He said that under the circumstances at that time he did not feel comfortable in amending the license and that is why he wrote the memo. He went on to explain that after NRC insisted that a Part-61 review be conducted, the entire regulatory environment at DRC changed for the better. He said that the NRC guidelines provided requirements with which Envirocare had to comply in order to amend their license. This resulted in much better compliance on the part of Envirocare.

On May 29, 1991, a memo from an inspector to the Environmental Health Manager discussed the inspector's concern that because of the recent firing of Envirocare's site manager Envirocare was understaffed. The memo reads:

*It is my opinion that Envirocare is understaffed. With the loss of the site manager, the potential loss of the site RSO [Radiation Safety Officer] and the expected loss of the Corporate RSO their continued operation should be reevaluated as soon as possible. If Envirocare cannot obtain the staffing that is appropriate and if the staff terminations continue as in the past, the BRC should terminate disposal activity until such time as they can be staffed as required.*

According to the inspector who wrote this memo, Envirocare had established a pattern of firing personnel for what he considered to be insignificant reasons. He conceded that personnel decisions were Envirocare's business, but noted that Envirocare's license requires the organization be fully staffed with competent, trained personnel. He said Envirocare's pattern of continually firing personnel led to compliance problems because new personnel tend to make mistakes until they learn the regulatory rules and license requirements. The inspector stated that just as a person was becoming fully trained and familiar with all the rules and regulations Envirocare would fire them. This resulted in a new person making the same mistakes and is why Envirocare was cited for some of the same violations over and

over during the first few years of operation. He said Envirocare currently seems less willing to fire personnel. It should be noted that neither the site or corporate RSOs have been released.

There are several other memos and letters in DRC's files pertaining to compliance issues at Envirocare. However, instead of isolating individual violations or memos expressing concern over problems, it seems more reasonable to focus on the overall compliance performance of Envirocare. According to DRC inspectors, most of the compliance problems occurred during the early stages of operations but recently Envirocare has shown progressive improvement in the area of compliance. Inspectors also stated that Envirocare is in compliance with the conditions of their license. According to DRC staff, problems do exist and more problems will probably occur in the future because compliance enforcement is an on-going process. It is the compliance inspector's job to identify areas of non-compliance and report them.

### Recommendation:

1. We recommend the Division of Radiation Control develop internal policies to better define requirements for waste streams and characterizations. Emphasis is needed particularly in the treatment of waste streams mixed by the waste generator.

### (3) Is BRC monitoring Envirocare in such a manner as to prevent radioactive contamination of the environment?

Chapter III discusses DRC's environmental monitoring program in detail. In summary, Envirocare is required to perform environmental monitoring to demonstrate that disposal operations are not polluting the environment. In order to verify the results of Envirocare's environmental monitoring, DRC conducts regularly scheduled tests of environmental conditions, sampling soil, air, groundwater, vegetation, wildlife, and comparing their results with those of Envirocare. To date, DRC's environmental monitoring has confirmed Envirocare's results showing the environment is not being polluted from disposal operations at the site. We asked Dale Smith Consulting to examine the results of Envirocare's environmental monitoring reports and the results of DRC's environmental monitoring reports. Dale Smith Consulting concluded that Envirocare's environmental monitoring results meet the prescribed limits established by NRC guidelines and that DRC's monitoring program appeared adequate to confirm Envirocare's testing.

### (4) Is it appropriate for BRC to file letters discouraging the establishment of similar low-level radioactive disposal sites within other states?

This question was raised because of the position taken by the director of DRC in opposition to two projects proposed by Umetco Minerals Corp. The first was a proposed radioactive disposal site at Uravan, Colorado and the second was a proposed uranium extraction operation at Blanding, Utah. It is difficult to determine whether the director of DRC acted outside the bounds of his authority in opposing these projects. The **Utah Code** charges the director of DRC with the responsibility of protecting the state's citizens and the environment from the harmful effects of radiation. Given this charge, it seems appropriate for the director of DRC to file letters discouraging the establishment of disposal sites, provided those sites pose a danger to the state. It would not be inappropriate, however, for the director of DRC to discourage the establishment of sites if they did not pose a danger to the state.

Umetco and other competitors in the radioactive waste disposal industry have accused the director of DRC of using his position to favor Envirocare and to discourage the establishment of other disposal sites that would compete with Envirocare. We were unable to determine whether the actions taken by the director of DRC in opposition to the Umetco proposals were intended to favor Envirocare by eliminating competition. We were also uncertain whether statements made by the director of DRC in opposition to the Umetco projects reflected the official position of DEQ and the state of Utah or whether they were the director's personal opinion.

In another controversial incident, the director of DRC appears to have taken an active role in the sale of state-owned equipment to Envirocare. The sale was controversial because another company claimed they were unfairly excluded from having an opportunity to bid on the equipment. The director of DRC told our office that he had nothing to do with the sale. However, documents from State Surplus Property seem to indicate that he was involved.

Because of the extremely competitive environment surrounding the waste disposal industry, in our opinion DEQ management should exercise great caution and avoid actions that may give the appearance of assisting one company over another. Official positions for DEQ and the state should come from the director of DEQ working in conjunction with the Governor's office. Also, the sale of all state owned surplus equipment should be conducted through the Division of Surplus Property and all interested parties should be given the opportunity to bid on the equipment. In order to assist the reader in understanding these issues, we have attempted to reconstruct the facts relating to the Umetco proposals and the sale of state property to Envirocare from available information.

**The director of DRC opposed two radioactive waste projects proposed by Umetco**. The first project was a proposal to locate a radioactive disposal site at Uravan, Colorado near the southeastern Utah boarder. The Umetco disposal site could accept material similar to Envirocare. In fact, at the time of the proposal the Umetco site was competing with Envirocare for the contract to dispose of radioactive waste from the Denver Radium Clean-up project. The contract was eventually awarded to Envirocare. The second project was a proposal to ship waste from a company in Oregon to Umetco's White Mesa Mill for the purpose of extracting uranium. According to Umetco's proposal, after uranium was extracted the remaining waste would be disposed of in Umetco's mill tailings pond at the site. The

director of DRC objected to the Colorado site because of its proximity to the Colorado River system and because of unanswered questions relating to the geology at the proposed site. He objected to the second proposal because he believed Umetco was trying to operate a disposal site under the pretext of a uranium extraction operation.

The director of DRC told our office he opposed the Colorado site because he felt the location was unsafe and that Colorado had not done an adequate job of assessing the site's suitability. He said the site's geology, based on a Utah state geologist's review, was not acceptable. We obtained a copy of a letter opposing Umetco's proposed disposal site in Colorado, written by the Director of DRC to the Rocky Mountain Low-Level Waste Board. The letter outlines his concerns over the site selection process and geology. The director of DRC was also quoted by the news media stating, *"He would urge the Governor to challenge the legality of the licensing process if Colorado decided to approve Umetco's license."* The director of DRC told our office he opposed Umetco's proposed uranium extraction project because, in his opinion, it was an attempt to operate a disposal operation under the pretext of an extraction operation. He said the project did not make economic sense because it would cost Umetco more to ship the waste from Oregon than could be recovered from the uranium extraction. In his opinion, Umetco would have to collect money for disposal in order for the project to make economic sense. In a newspaper article, the director of DRC referred to Umetco's plan as *"Sham Disposal"*. A representative from Umetco complained that the director of DRC had, *"unfairly prevented their facility from accepting an appropriate material, while clearing the way for Envirocare to accept a wide variety of radioactive materials."* DEQ's official view regarding this issue was stated in a letter signed by Utah's governor to Colorado's governor.

The NRC recently approved Umetco's uranium extraction project in Blanding. DRC has requested a hearing with NRC to object to the ruling. NRC officials we spoke to stated that they were not concerned with the economics of the operation, only the regulatory process. They said from a regulatory point of view, there is no reason why Umetco's proposal should be denied---it is in compliance with NRC guidelines.

**The director of DRC may have aided in the sale of state owned equipment to Envirocare.** In conjunction with the Vitro clean-up project, the state purchased a rail-car dumper that was used to unload waste. After completion of the Vitro project, the dumper was sold to Envirocare of Utah; a sales invoice dated June 19, 1987 shows the dumper was sold to Envirocare for $150,000. The events surrounding this sale have resulted in controversy and added to the perception of wrongdoing within DEQ. The **Utah Code** specifies that all excess state-owned property is to be sold through the Division of Surplus Property. However, in this case it appears the sale of the rail-car dumper may have been arranged by the director of DRC. An internal memo from the Division of Surplus Property dated June 24, 1987 indicates that the sale was arranged by the Director of DRC. The memo states that the director of DRC called surplus property to inform them that a company [Envirocare] had approached him about buying the dumper. The memo also maintains that a representative from United States

Pollution Control, Inc. (USPCI) called Surplus Property to inquire about purchasing the dumper and was upset when he learned it had already been sold.

He told Surplus Property that, based on a conversation he had with the director of DRC several months earlier, he was led to believe he would have an opportunity to bid on the equipment.

A memo written by the representative from USPCI indicates that he contacted the director of DRC about purchasing the rail-car dumper in March of 1987 and was told he would be notified when it became available and that USPCI would be given an opportunity to bid on the equipment. The director of DRC stated that he has no recollection or record of this call. USPCI's representative did contact the DRC director after the completion of the Vitro project, the director of DRC told him that the equipment had been turned over to Surplus Property. When the USPCI representative called Surplus Property, the director of Surplus Property told him that the rail-car dumper had been sold to Envirocare and that the sale had taken place before the dumper had officially become surplus property. The unusual circumstances surrounding this sale resulted in a letter of protest being filed by USPCI, asking that the sale be set aside and that USPCI be given an opportunity to bid on the equipment. The letter complained that USPCI had been unfairly excluded from having an opportunity to bid on the dumper. The letter states that the director of Surplus Property indicated to USPCI's legal counsel that the director of DRC indicated to him that Envirocare was the only party who expressed interest in purchasing the rail-car dumper.

When asked about the sale of the rail-car dumper to Envirocare, the director of DRC reported that he had nothing to do with the sale, and that it was handled entirely through the Division of Surplus Property. However, according to the aforementioned documents this does not appear to be the case. These documents seem to indicate that the director of DRC was heavily involved in the sale.

### Recommendation:

1. We recommend the Department of Environmental Quality direct the sale of all surplus property to the Division State Surplus Property.

## (5) Is BRC requiring Envirocare to maintain sufficient financial resources to protect itself or Utah from long-term liability?

Chapters III and IV describe in detail the financial surety account established to close and monitor the Envirocare site. All radioactive waste sites have liability coverage for their on-going operations. Financial resources available for long-term liability for closure and post-closure are provided for through financial surety accounts. In summary, Envirocare does have liability coverage for its daily operations and also has $1,231,000 set aside in a closure/post-closure surety trust account. DRC has determined that the amount will be sufficient to close and monitor the site. However, DRC has not required additional funds to be set aside to protect the state from the long-term liability of unforeseen events that could occur after closure. Other states with low-level disposal sites have significantly larger closure/post-

closure accounts designed to protect their states from unforeseen problems. For example, South Carolina has $53,000,000, Nevada $5,700,000, and Washington $32,700,000 in their closure/post-closure accounts. It should be pointed out that these sites receive higher classifications of wastes that are magnitudes greater in radioactive content than that which Envirocare currently receives. The amounts held in their accounts have been built up through the collection of fees over several years. The decision of whether or not the state should require additional funds to be set aside to protect the state from long-term liability is a policy question best addressed by the state Legislature. Legislatures in the other states with low-level sites have elected to build-up their closure/post-closure accounts by imposing a fee on each cubic foot of radioactive waste disposed of within their state. Currently, Utah does not impose a fee for the purpose of building-up its closure/post-closure account.

### (6) Is Envirocare equipment adequate to accurately analyze waste to ensure that no material is stored which exceeds Envirocare's licensing agreement as granted by the state of Utah?

This question stems from an NOV issued to Envirocare on July 17, 1990 for failure to correctly identify radioactive isotopes and concentration levels contained in 10 sample tests furnished by DRC. Under the conditions of the NORM license, Envirocare was required to identify radioactive isotopes and concentration levels of incoming shipments. However, Envirocare repeatedly failed sample tests provided by DRC. As a result, the above NOV was issued. Because Envirocare has not been certified to analyze incoming shipments, DRC issued a license amendment authorizing Envirocare to send samples to an independent laboratory for analysis. Results from the laboratory were to be reported within 45 days. If the independent laboratory analysis determines radioisotopes or concentration levels are outside the limits of the license, the waste may be shipped back to the generator. According to Dale Smith Consulting and NRC officials, using an independent laboratory for analyzing samples is a common and accepted practice throughout the industry. However, Dale Smith Consulting pointed out that 45 days means a significant delay in obtaining results and may not be adequate for the division's needs. In connection with this issue, on February 25, 1992 Envirocare was issued an NOV for failure to receive results within 45 days from the independent laboratory. Some results were not received for over 90 days. DRC inspectors also discovered that Envirocare had not sent samples from 44 shipments to the independent laboratory for analysis. As a result, an NOV and a civil penalty of $8,500 were issued. DRC management has amended Envirocare's license to allow up to 90 days for results from the independent laboratory.

### (7) Is BRC acting within legislative parameters when permitting Envirocare to store radioactive material---for which Envirocare does not have a license to dispose?

Chapter IV of this report discusses the questions surrounding the issuance of conditional permits. In summary, DEQ issued a conditional permit allowing Envirocare to ship radioactive waste into the state for temporary storage prior to meeting all licensing requirements contained in NRC Part-61 guidelines. DRC's administrative rules do not contain provisions allowing for the issuance of conditional permits. However, the director of DEQ stated that other divisions within his department have found conditional permits to be useful in spelling out the specific requirements that must be met in order to obtain final approval of a license. Therefore, he authorized the use of a conditional permit in the licensing of Envirocare.

The controversy surrounding Envirocare's conditional permit stems from a debate over whether or not facilities should be allowed to bring radioactive waste into the state before meeting all the requirements for obtaining a license for disposal. The NRC does not approve of the use of conditional permits. They believe facilities should comply with all licensing requirements before waste is shipped to the facility. DEQ management considers the decision allowing Envirocare to bring waste into the state prior to obtaining final approval of the license imposed no additional risk to public health and safety and the environment. DEQ management feels that conditional permits help speed up the licensing process and are allowed by law. DEQ management believes its position is supported by an informal opinion by their legal counsel. Opponents to conditional permits believe it is unwise to allow facilities to ship waste into the state before they have demonstrated that they can design and construct a disposal cell, operate a facility safely, and comply with all the other requirements of obtaining final approval. DEQ officials believe sufficient analysis was performed to demonstrate that all requirements could be met. In our opinion, this is a policy question that should be resolved by DRC's board and the state Legislature.

### (8) Is Envirocare disposal of radioactive materials which are frozen in violation of licensing regulations?

Envirocare's license does not prohibit placement of frozen material. The restriction imposed by the license requires lifts to be compacted to 90 percent of optimum density. Placing frozen material in the cell could result in poor compaction of the lift because this process creates hollow pockets after thawing occurs. Whether or not Envirocare disposed of frozen material cannot be determined. Envirocare states that they have not placed frozen material in the cell. A video tape recording given to our office and shown on local television news shows what appears to be frozen waste being unloaded from rail cars at the Envirocare site. However, there is no state documentation or verification as to whether frozen material was actually placed in the cell.

Envirocare has contracted with an independent engineering firm to perform their compaction tests. Prior to February of 1992, DRC did not conduct independent tests to confirm Envirocare's compaction results. Beginning in February of 1992, DRC contracted with American Testing Laboratories to perform compaction tests on completed lifts. Because

DRC did not perform tests on the completed lifts during the time when frozen waste was reportedly placed in the disposal cell, there is no way for the state to document whether or not this actually occurred. Envirocare's compaction tests show that all tested lifts have met the requirements of the license.

### (9) Is Envirocare properly administering the disposal site to ensure that employees are protected against exposure to hazardous materials?

### (10) Is Envirocare's training of employees adequate to ensure that radioactive waste is disposed of according to state and federal guidelines?

Questions #9 and #10 can be answered together. Chapter III and Appendix B describe NRC regulations and guidelines relating to employee training and the protection of on-site workers adopted into DRC rules. In summary, Envirocare is required under the conditions of their license to comply with state-adopted NRC regulations limiting radiation exposure to on-site workers to levels conforming with the ALARA (as low as reasonably achievable) principle. NRC guidelines also require employee training. State and federal inspections have not found any violations of exposure limits to on-site workers and no major violations of training for on-site workers. On-site workers are required to wear badges which monitor the amount of exposure they receive, and are restricted to exposure levels of 1,250 mrem of radiation per calendar quarter by NRC guidelines. The pathway analysis that established the radioactive concentration limits of the license were based in part on exposures to on-site workers.

### (11) Is the fee charged Envirocare adequate to protect the state of Utah from possible liability at the site, the cost of regulating the industry, and to provide compensation to the state for storing radioactive waste?

Chapters III and IV contain detailed information pertaining to disposal fees. In summary, other states with low-level disposal sites impose fees for the following purposes: (1) to protect the state from long-term liability; (2) to cover the cost of regulating the industry; and (3) to compensate the state for the risk associated with housing a radioactive disposal site. Utah does not impose a fee for the purpose of building up a fund designed to protect the state from long-term liability. Question #5 above discusses the fees imposed by other states with low-level sites used to build up a fund to protect their state from long-term liability. Utah does impose a fee to cover the cost of regulating the industry. During the 1992 legislative session, Senate Bill 25 levied a fee of $2.00 per-ton on radioactive waste received for disposal at Envirocare. The fee will be increased to $2.25 per ton in 1993 and to $2.50 per ton in 1994. The bill abolished an annual licensing fee of $118,000 previously collected to cover the cost of regulating the industry. According to the director of DRC, the division will receive

approximately $200,000 from the fee, which should be sufficient to cover the cost of regulating the industry. Utah does not impose a fee to compensate the state for housing the Envirocare radioactive waste disposal site. Part of the fee imposed by other states with low-level sites is intended to compensate their state for housing a disposal site. For example, Washington collects $3.17 per cubic foot for the state's general fund and South Carolina collects $6.00 per cubic foot for the state's general fund. These fees are in addition to surcharges and other closure/post-closure fees imposed.

While Utah does not collect a fee for the state's general fund, Tooele County does collect a fee to compensate the county for housing the Envirocare site: $25 per ton on all waste disposed of at Envirocare. Through 1991, Envirocare has disposed of approximately 209,000 tons of waste. The maximum capacity of the currently scheduled cells at the Envirocare site is approximately 6.4 million tons. In our opinion, the decision of whether a fee should be imposed on waste disposed at Envirocare for the purpose of building up a fund to protect the state from long-term liability or to compensate the state for housing a disposal site is a question to be addressed by the Legislature.

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# Chapter III
# DEQ Programs Designed To Protect Public Health, Safety, And The Environment

Utah Department of Environmental Quality (DEQ) programs are designed to protect public health, safety, and the environment from the adverse effects of hazardous and radioactive wastes disposed in Utah. Public protection is based on the application of relevant state and federal regulations through licenses and permits and the enforcement of the licenses by department compliance staffs. This responsibility exists because Utah has entered into agreements with federal agencies to administer hazardous material and radiation control programs based on federal rules and regulations. In Utah's case, federal regulations have been adopted and added to state regulations to form the basis of the state's waste control programs. The Division of Solid and Hazardous Waste (DSHW) administers the state's hazardous waste control program. The Division of Radiation Control (DRC) administers the state's radioactive waste control program.

Program control for both divisions can be separated into two parts. First is the development of an agreement with the waste disposal operator in the form of a license or permit outlining the parameters of operation. Second is the ongoing review of operations to ensure compliance with the agreement. The object of both activities is to protect public health, safety, and the environment. Licensing is not a simple matter of either allowing or not allowing a waste disposal site. A license needs to fully address a number of issues if it is to protect public well being by meeting federal and state requirements. Compliance programs need the ability to monitor all requirements stipulated in the license agreements if the process is to be successful. This chapter reviews the major elements of the state's waste disposal programs and how each of these elements protects the public.

## DEQ Waste Disposal Licensing Developed to Protect Public

DEQ is responsible for regulating and licensing hazardous and radioactive waste disposal within the state. In order to carry out their mission, DEQ has adopted federal regulations and licensing requirements developed to protect public health, safety, and the environment. These federal guidelines are the national regulatory standard and establish scientific and engineering standards for site location, design, construction, operating procedures, environmental monitoring, and closure plans for disposal sites. DSHW has adopted EPA regulations and licensing requirements while the DRC has adopted NRC regulations. In both cases, Utah's

divisions have signed agreements with the federal agencies authorizing Utah to be the lead agency for enforcing regulations. Because of these regulations, the licenses are complex documents that not only detail the kinds of allowable wastes that can be disposed but also outline site selection, design, operations, monitoring, record keeping, and even financial ability. In each facet of the license the purpose is to ensure public safety from the operation. DSHW followed EPA guidelines in licensing the APTUS burn plant, the USPCI landfill, the USPCI burn plant, and the Envirocare mixed waste cell in Tooele county as well as the industrial landfill site in East Carbon. DRC followed NRC guidelines in licensing the Envirocare low-level radioactive waste landfill.

### DSHW Has Adopted and Follows EPA Guidelines.

The permit process followed by DSHW in licensing hazardous waste disposal facilities is a major control mechanism in the protection of public health. The process is designed to assure proper construction and operations before the facility opens. DSHW's administrative rules and licensing requirements are patterned after EPA guidelines outlined in The Code of Federal Regulations Title 40 (40 CFR). DSHW has developed the state's hazardous waste control program around 40 CFR to maintain Utah's agreement state status and, more important, because 40 CFR is the most inclusive set of regulations dealing with hazardous waste available.

The permit process begins with the submission of an application. This application is based on guidelines provided by the division's permit staff. The guidelines list references from 40 CFR pertaining to every area of the permit. It is up to the company submitting the application to be acquainted with the rules and provide the reports and analysis required in the application. Part "A" of the application includes information on the facility operator and on the proposed operation, such as location of the facility, a scale drawing of the facility, a topographic map of the site, a description of the disposal process, and estimated annual quantities of hazardous wastes to be treated. Part "B" of the application includes technical information on the process of waste disposal including facility description, waste characteristics, cell design, cell construction, groundwater monitoring procedures, personnel training, closure/post-closure plans, and financial requirements.

DSHW staff review applications to ensure that all required information is included. For example, staff would review the company's description of the liner they propose to use in the disposal cell to make certain it meets EPA standards. Nearly every application has problems or areas that need to be corrected. After staff review, the application is returned to the facility to make required changes. Once the changes are made, the facility resubmits the application and DSHW conducts a second review. This process is repeated until the application is approved or until DSHW issues a "Notice of Intent to Deny A Permit."

In order to ensure timely processing of an application, state statute imposed a 270-day limit on DSHW to either approve or deny applications. If the application is approved, a public hearing is held along with a public comment period for 45 days. If there are no major

complaints or appeals during the hearing or comment period, a final license is issued for a period of 10 years. After 10 years, the facility must then renew its license by going through the entire process once again.

The EPA has approved the DSHW licensing program. Twice each year the EPA conducts a general review of the entire DSHW program including its licensing and compliance efforts. In this review EPA staff document how close the state came to achieving the goals of the EPA-state contract for that year. EPA also takes notice of any areas within DSHW not conforming to EPA rules or the established agreement between EPA and the state. The latest review, in mid-year 1992, discussed the appropriateness of items such as warning letters, violations, and penalties. The review found that DSHW was generally conforming with the State-EPA agreement. The only suggestion EPA had was for the state to be more timely in their determination of violations.

### DRC Has Adopted and Follows NRC Guidelines

As with the DSHW, DRC's administrative rules and licensing requirements have been patterned after the guidelines (NRC Part-61) set by their federal authorizing agency, the NRC. In May of 1990, after an extensive six year review of Utah's radiation control program, an amended agreement was signed granting authority to the state for licensing land disposal of NRC-regulated material. The resulting license was reviewed by our consultant, who found no problems with its technical elements. Since the state's initial application to receive NRC Agreement status, the NRC has conducted four audits of the state's program. With the exception of a few recommendations, NRC's audits found the state's radiation control program to be in compliance with NRC guidelines overall. In addition, the NRC conducted an extensive review of Utah's licensing of Envirocare because Envirocare was the first low-level facility licensed from start to finish under NRC Part-61 guidelines.

According to NRC officials, NRC was heavily involved in the licensing of Envirocare. They said they made several visits to the Envirocare site and met with Division staff to ensure that all requirements of Part-61 were in full compliance. Overall, NRC's review of the Division's Envirocare licensing was positive. One NRC official stated that Envirocare has met all of the major requirements contained in Part-61 and that public health, safety, and the environment should be adequately protected, provided Envirocare continues to operate the facility within specified NRC guidelines. NRC Part-61 guidelines are the most comprehensive regulations currently available on the regulation of radioactive waste disposal operations. They include analysis of site selection, cell design, construction, environmental monitoring, disposal operations, and other critically important requirements necessary to ensure the protection of public health and safety and the environment.

Dale Smith Consulting was asked to review the disposal license issued by DRC to Envirocare to determine: (a) whether provisions contained in the license conform to NRC and other regulatory standards, and (b) whether the provisions of the license are adequate to ensure

protection of public safety. Smith's conclusion was that, *"In general, the conditions of the license and the requirements of the rules appear to deal satisfactorily with protection of public health and safety."* There are differences between the license conditions and the

NRC rules and corresponding State of Utah Radiation Control Rules, the most notable being the exemption of the requirement for public ownership of the site in the future. (For further information refer to Appendix A.)

In Utah, the licensing of a radioactive waste disposal site begins with the review of a submitted application based on information derived from a number of federal documents. If it is determined that any part of the submitted application is incomplete or unacceptable, the applicant is informed and provided with a list of deficiencies. Deficiencies are spelled out in an official document called a Notice of Deficiency (NOD). Once NODs are corrected and the application is accepted as complete, Division staff review the license application, including both the Safety Analysis Report and the Environmental Report (see Appendix B for information found in these reports). After the review of the Safety Analysis Report and the Environmental Report, Division staff issue their own draft Safety Evaluation Report and draft Environmental Assessment. The draft reports are made available for a 30-day public comment period. After receiving public comments, if any, the Division issues a final Safety Evaluation Report and a final Environmental Assessment. When the application satisfactorily meets the requirements, a license is issued. The license authorizes the disposal site operator to receive, possess, and dispose of low-level radioactive waste.

The Safety Evaluation Report addresses site location and characteristics, disposal cell design and construction, facility operations, site closure, safety assessments, occupational exposure to on-site workers, and financial assurances used to ensure sufficient available funds to close and monitor the site. The Environmental Assessment addresses the effect and consequences of radioactive waste disposal on the environment as well as staff recommendations regarding the proposed licensing. Division staff also conduct independent tests and studies to confirm information supplied by the applicant. Descriptions of the major topic areas addressed in the Safety Evaluation Report and the Environmental Assessment are listed in Appendix B. The applicant is required to provide appropriate scientific and engineering studies for each area.

Dale Smith Consulting's review found that these elements were quite similar to design elements used by the NRC. Cell design, assessments, and closure plans appeared to be sufficient. One problem unique to the Envirocare site is the proximity of cells containing material regulated by different agencies. The configuration and closeness of disposal cells at Envirocare could pose monitoring or containment problems. Envirocare currently has plans for four waste cells (NORM, Mixed Waste, and two Low Level) located next to each other and the State's Vitro cell is also located at the site. Regulation of the site in the short-term and over the long-term custodial period will be difficult because while the environmental monitoring system can identify a radiation escape it cannot, in some cases, clearly establish the disposal cell that is the source of the escape. Critics claim this could result in litigation to establish the parties responsible for any future clean-ups.

## Disposal Operations Are Defined by the License

The scientific and engineering standards outlined in federal and state regulations are the basis of Utah's license agreements. In the case of hazardous wastes, the federal regulatory standards are firmly established and have lent strong support to Utah's licensure of RCRA waste facilities. It has been a somewhat different situation with radioactive wastes because licensure for the DRC began with a NORM facility outside the control of any federal regulations or guidelines. The licensing process still had to define the operations of the facility from siting to site closure.

The disposal license issued to Envirocare by DRC is the basis for regulatory control over the site. Requirements of the license conform to state-adopted NRC guidelines designed to protect public health, safety, and the environment. The license restricts Envirocare to receiving lower classifications of waste than received at other low-level disposal sites. Envirocare operates a landfill-type operation that disposes of low-activity, Class A contaminated soil and debris. Class A wastes are wastes with the lowest concentration levels recognized by the NRC. The other low-level sites dispose of higher concentration wastes called Class B and C that, by federal regulation, are stabilized by solidification and containment in high integrity containers. The license restricts the concentration level of each radionuclide disposed of at Envirocare to below specified numeric limit. Concentration limits were established by a pathway analysis which calculated the maximum exposure that would be incurred to on-site workers and the general public.

Envirocare's original license was issued by the state for the disposal of naturally occurring radioactive material (NORM). NORM material was not and is not regulated by the NRC. Envirocare's site was originally used by the state of Utah and the Department of Energy (DOE) in a joint clean-up project of radioactive uranium mill tailings from the defunct Vitro Chemical Company. In order to carry out the project, the state purchased approximately 600 acres of School Trust Land from the Division of State Lands and Forestry. However, only about 100 acres of the land were used in the Vitro clean-up project. The remaining 500 acres were later purchased by Envirocare of Utah after a complex series of land trades between Tooele County and the Division of State Lands and Forestry. After obtaining the land, Envirocare applied for a license to dispose of NORM waste.

NORM is defined as any radionuclide which is radioactive in its natural physical state (not man made) that does not include NRC regulated source, byproduct, or special nuclear radioactive material. Radium-226 and Thorium-232 are the most common radionuclides found in NORM. Conceptually, the NORM waste to be disposed of at Envirocare would consist of: (a) contaminated soils and structural debris from remedial action clean-up projects undertaken by various state or federal agencies; (b) industrial processing wastes mandated to be disposed of at regulated disposal sites; or (c) other mill processing wastes deemed appropriate. Physically, the bulk of the waste to be disposed of at Envirocare would consist of dry soils and

small amounts of debris such as concrete, asphalt and other materials contaminated with NORM.

Envirocare proposed to dispose of NORM waste in shallow landfill cells adjacent to the State/DOE Vitro cell. Envirocare based its proposal on the concept that the NORM waste to be disposed of would be limited to radioactive concentrations equal to or less than material from the Vitro project. Therefore, no additional risk to public health and safety and the environment would result. Envirocare's plan called for the material to be placed into a disposal cell constructed partly above ground and partly below ground. Since there was little difference between the NORM material and the Vitro tailings, the level of control seemed sufficient. The Vitro waste disposal operation and the lessons learned there by the DRC became the foundation of the NORM license and the subsequent license amendments.

**Use of state adopted NRC Part-61 requirements regained some control over the amendment process**. After issuing the original NORM-only license, the division accepted a series of license amendments to allow disposal of additional types of radioactive waste. Each license amendment was reviewed by the DEQ and by the EPA for mixed wastes. The license amendments greatly increased and broadened the type of radioactive wastes addressed by the license. One amendment authorized the disposal of NRC regulated low-level waste. In order to receive authorization to dispose of NRC regulated waste, Envirocare of Utah, as the licensee, was required to meet the licensing requirements of NRC Part-61 which had been adopted into state rules. The overall effect of the amendment process resulted in the evolution of the license from a NORM facility license to a class A low-level radioactive and hazardous waste disposal facility license.

The disposal license issued by the DRC contains the regulatory requirements with which Envirocare must comply. The license specifies operational procedures that must be followed; the types of waste that can be handled, stored, and disposed; the design and construction of disposal cells; environmental monitoring that must take place; and numerous other procedures and practices that must be followed. The license is the basis for regulatory oversight. If operations at the site are not within the provisions of the license, DRC has the authority to issue notices of violation, impose civil penalties, or halt operations at the site. From a regulatory point of view, the license should contain all provisions found in the state rules and NRC guidelines. The terms and conditions of the license should contain the regulatory requirements necessary to ensure that public health, safety, and the environment are adequately protected.

In addition to Envirocare, there are three other low-level radioactive waste disposal sites in the United States. They are located at Barnwell, South Carolina; Beatty, Nevada; and Hanford, Washington. The other three sites accept higher classifications of waste than Envirocare. The Barnwell, Beatty and Hanford sites are authorized to dispose of Class A, Class B, and Class C wastes. The majority of waste disposed of at these sites is Class B and Class C waste. Envirocare is currently restricted to disposal of Class A radioactive waste

only. In order to emphasize that they do not currently receive Class B and Class C waste, Envirocare has recently begun calling its facility a "low-activity" site.

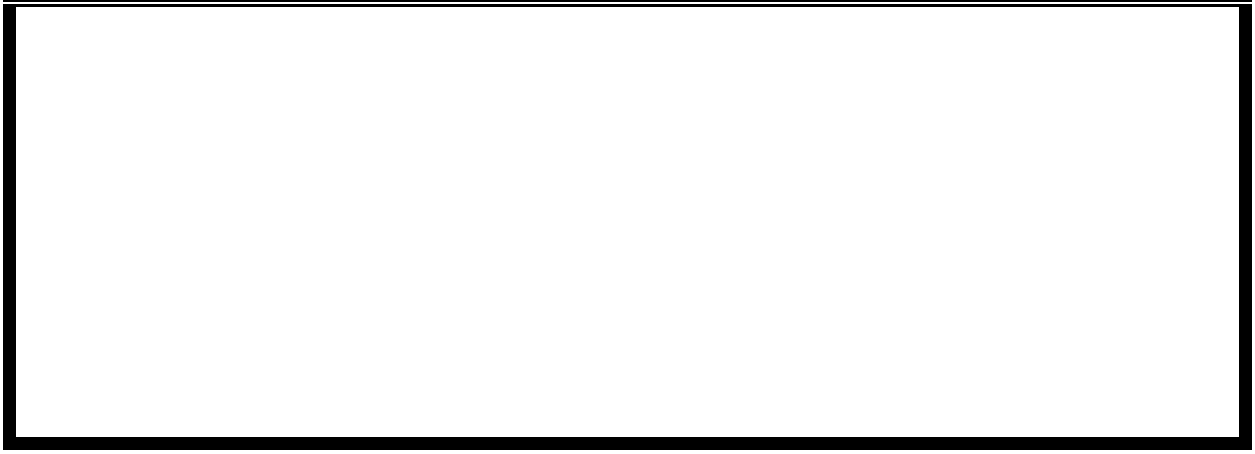
All four commercial low-level sites operate under the regulatory requirements contained in NRC Part-61. The Barnwell, Beatty, and Hanford sites were in operation for several years prior to NRC's implementation of NRC Part-61 guidelines; their licenses have been amended by the respective states to reflect the regulatory requirements of Part-61. DRC licensed Envirocare under NRC Part-61 guidelines at the time Envirocare applied to dispose of NRC regulated low-level wastes. Therefore, all four commercial low-level sites operate under the regulatory requirements contained in NRC Part-61.

**Even though all of the sites are governed by Part-61 their operations are dissimilar.** The other three low-level sites were designed and licensed to receive and dispose Class C or lower radioactive waste in sealed containers (barrels). Waste shipped to these sites arrives in sealed containers. The containers remain unopened and are placed in disposal cells. After the containers are placed in disposal cells, the cells are backfilled with soil to bury the containers. At final closure, a protective cover will be placed over the disposal cells. Problems have occurred with protective covers at former low-level disposal sites in Sheffield, Illinois, and Maxiflats, Kentucky; poor packaging of waste, partially filled containers with extensive void spaces, the random placement of waste, and incomplete backfilling between containers resulted in soil settlement beneath the protective covers, settlement has resulted in the deterioration of protective covers, puddling of precipitation, and infiltration of water into the cells. NRC Part-61 guidelines were developed to address and correct these problems. Part-61 guidelines contain regulatory requirements designed to prevent similar problems from occurring at other low-level sites.

The Utah-issued license is for a site designed to receive and dispose of Class A waste in a landfill type operation. Its landfill operation is similar to those used by RCRA waste disposers but is unique to low-level radioactive waste sites. The actual cell design is conceptually similar to sites used by the DOE for uranium mill site remedial action. It differs from sites accepting Class B and C wastes in the fact that B and C wastes are buried deeper and, often, in trenches rather than larger cells. As a radioactive waste site, the most important cell design aspect is the cell's massive earthen cover meant to control intrusion into the covered material and prevent the release of radon gases. The entire cell is constructed of natural materials, unlike RCRA cells which have multiple plastic liners to prevent chemical contamination of groundwater and soils. A cross-section of the DRC approved cell design is shown in Figure I. As stated earlier, our consultant found the cell design to be appropriate for the kinds and concentrations of waste received.

**FIGURE I**

**CELL DESIGN**



Most of the waste shipped to Envirocare arrives in covered rail cars; small amounts arrive by truck in containers. After the waste arrives, rail cars are unloaded and containers opened and the waste is removed. The waste is placed in disposal cells in 12-inch high layers. The layers are then compacted to 90 percent of optimum density. This form of placement provides for uniform arrangement of the contaminated soils and debris. Essentially, there should be no voids in the cell, resulting in a more stable disposal site and effectively eliminating problems associated with soil settlement. At final closure, a protective cover will be placed over each disposal cell.

The removal of waste from containers and handling of open sources of contaminated material increases the chances for dispersal of radioactive material into the environment at the Envirocare site. Therefore, Envirocare is required to control dispersion through the use of water spray trucks to reduce dust and the interim covering of waste with clay prior to final closure. The license requires air, soil, and vegetation monitoring around the site to demonstrate that dispersion of radiation has been controlled.

**Envirocare's radiation concentration limits also make its operations unique to the industry.** Envirocare is only licensed to receive radioactive waste below specified numeric concentration limits that have been set for each radionuclide approved for disposal at the site. In general, the concentration limits were established by a radiological pathways analysis of potential doses to site workers and the general population. The radiological pathways analysis was prepared for DRC by Rogers and Associates Engineering Corporation of Salt Lake City, Utah (Appendix C contains further information on the pathway analysis performed by Rogers and Associates). Rogers and Associates evaluated the potential doses to site workers and the general population for each radionuclide that would be disposed of at

Envirocare (Appendix D shows the concentration limit of each radionuclide covered by the license).

The concentration limit for Radium-226 was established during the licensing of Envirocare as a NORM facility. The limit of 2,000 picocuries per gram was not based upon scientific analysis, according to DRC staff. Instead, Envirocare proposed the maximum concentration limit of 2,000 picocuries per gram of Radium-226 because it represented the cut-off point for Department of Transportation (DOT) shipping regulations. Material with concentrations of radioactivity above 2,000 picocuries per gram are subject to DOT shipping regulations. Material with concentrations of radioactivity below 2,000 picocuries per gram are not subject to DOT regulations:

> *… pursuant to U.S. Dept of Transportation regulations, materials whose specific activity is less than this amount, are not considered to be radioactive for transportation purposes, and are exempt from regulatory concern under DOT.*

The pathway analysis conducted by Rogers and Associates concluded that 150 picocuries per gram of Radium-226 could be disposed of at Envirocare. However, this limit conflicted with the 2,000 picocuries per gram limit authorized by Envirocare's NORM license. Therefore, DRC decided to conduct further analysis on the maximum concentration limit of Radium-226 that could be disposed of at Envirocare. DRC conducted another pathway analysis using the GEN II model, a model used by the Department of Energy. The GEN II model concluded that 380,000 picocuries per gram of Radium-226 could be disposed of at Envirocare. As a result of the GEN II analysis, DRC asked Rogers and Associates to conduct another pathway analysis. Rogers and Associates' second pathway analysis concluded that 1,400 picocuries per gram of Radium-226 could be disposed of at Envirocare. In the end, DRC elected to maintain the concentration limit for Radium-226 set forth in the NORM license. In a report dated September 4, 1990, DRC explained their decision:

> *In the absence of clear definitive agreement among the generally accepted models or the other analyses provided to the Bureau, [DRC] cannot find compelling reason to change the existing licensed concentration for radium-226. Therefore, the Bureau will continue to authorize the licensee to receive for disposal, Radium-226 concentrations, up to 2,000 pCi/gm.*

Our consultant was asked to review the concentration limits contained in Envirocare's disposal license to determine whether: (a) the limits were in compliance with State and NRC guidelines, (b) the provisions of the license are adequate to ensure protection of public safety, (c) the concept of using a pathway analysis is a sound basis for regulatory control, and (d) the calculations for equivalent concentration limits shown in the license are accurate. Dale Smith Consulting concluded:

> *The Envirocare license does not reflect the waste classification scheme in R447-307,-308, and -309 of the State rules. However, all the limits established in the license meet the requirements for Class A waste as defined in the rules.*

*In several instances, license concentration limits are higher than values originally recommended by Rogers. Most significant is the concentration value for radium-226, the most common naturally occurring contaminant in waste.*

*Uranium-depleted concentration limit is set at 1.1E+05 pCi/g, approximately 4 times the recommended concentration for Uranium-238. Rogers recommends using the uranium-238 concentration for depleted uranium. No explanation has been provided for this difference.*

*To supplement their original work, Rogers and Associates produced report RAE-900/16-1, "ADDITIONAL RADIONUCLIDE CONCENTRATION LIMITS FOR THE NORM DISPOSAL SITE AT CLIVE, UTAH". In this report, 21 additional radionuclides were analyzed and concentration in waste were recommended. These recommendations were based on the occupational dose to workers and did not consider potential dose to off-site persons or inadvertent intruders. These recommended limits were incorporated into the Envirocare license, with the exception of Calcium-45 where a lower value was used and Radium-226 as explained above.*

Envirocare contends that the differences in Uranium-depleted concentrations have been adequately addressed in the second Rogers Report. In that report different assumptions on gamma dose rates account for the differences in Radium-226 and Thorium-232 concentrations and still maintain concentration levels within class A limits. Even though the license agreement keeps the concentration limits well within the NRC's Class A limits, questions have arisen. These questions primarily involve the variability of the limits between the various models and the elimination of intruder dose information. For example, the models have a variability of 2,500 times for the acceptable concentration limit for Radium-226, this variability clearly shows there is a problem with determining acceptable limits of radiation. The second area, elimination of intruder information and use of on-site worker information, is a question of regulatory function rather than safety. DRC rules state "*design, operation, and closure of the land disposal facility shall ensure protection of any individual inadvertently intruding into the disposal site…*" Because intruder exposure is highly unlikely, the DRC determined that only information on on-site worker exposure was justified in the determination of acceptable radionuclide concentration levels. Standards for on-site worker exposure allow considerably higher exposure limits.

## Financial Surety Agreements Are Intended To Continue Protection But May Not Be Sufficient

Financial surety accounts are required in both DRC and DSHW licenses to ensure the funding of closure and post-closure monitoring of disposal facilities. The accounts are dedicated strictly for this purpose and funds cannot be withdrawn from the account without approval from DEQ. Other states with hazardous and radioactive waste disposal sites have

required larger closure/post-closure accounts than Utah. The division determines the value set aside in these accounts based upon the site's closure plan, which requires operators of disposal sites to submit a detailed closure and long-term maintenance plan. The plan must contain specific analysis of geologic, hydrologic, or other disposal site data pertinent to the long-term containment of the disposed wastes. It should also contain the results of tests, experiments, or other analyses relating to closure and sealing of the site.

Setting the value of the surety for the DSHW issued license is a much more developed process than that used by the DRC. For the DSHW, financial coverage is determined by EPA statute and follows a set calculation. Even though this is a more rigidly set process, there is a concern that the period of time allowed to attain the proper level of surety funding does not necessarily match the facility's operating life. The facility is given a license for a ten-year period and is also given that same period to meet its surety obligation. This means there is a period of time where the surety may not be sufficient. In Utah's case, the surety obligation for the hazardous waste landfill site is $4,800,000. Only $2,200,000 has been collected because four years remains in the licensing period.

The surety agreement used by the DRC is not as highly regulated by the federal government and also has some points of concern. A review of the DRC surety agreement by Dale Smith found the agreement lacking. According to the rules developed by the DRC, all reviews and approvals should have been completed before the license was issued. Smith's and NRC's interpretation of the rules determined that the document submitted as the final closure plan was incomplete and thus inadequate to use as a base for determining costs. DEQ believes that the working documents used to determine costs are sufficient and the best available information. A second point was that Envirocare initially calculated surety income on a real rate of return five times higher than that used by the NRC. This greatly underestimates the funding necessary for long-term monitoring. The DRC recently analyzed the surety and found that investing in the required government-backed securities results in funding levels closer to those calculated by the NRC.

The question of sufficiency of surety is not new. Originally the DRC required the final closure plan to be based on a 30-year surveillance period similar to that of the plans set by the DSHW for RCRA wastes. The DRC now requires long-term maintenance and monitoring of sites for 100 years for radioactive wastes. As part of the closure and long-term maintenance plan, site operators are required to provide assurances that sufficient funds will be available to close and monitor the site. As an example, the DRC's regulations specify:

> *The applicant shall provide assurances prior to the commencement of operations that sufficient funds will be available to carry out disposal site closure and stabilization, including: (a) decontamination or dismantlement of land disposal facility structures; and (b) closure and stabilization of the disposal site so that following transfer of the disposal site to the site owner, the need for ongoing active maintenance is eliminated to the extent practicable and only minor custodial care, surveillance, and monitoring are required. These assurances*

*shall be based on Bureau approved cost estimates reflecting the Bureau approved plan for disposal site closure and stabilization. The*

*applicant's cost estimates must take into account total costs that would be incurred if an independent contractor were hired to perform the closure and stabilization work.*

Accordingly, the DRC has required Envirocare to deposit approximately $1.2 million in a surety trust account to fund the cost of closing and monitoring the site. The surety trust account has been approved by the division and reviewed by the NRC to provide some assurance that sufficient funds will be available for closure and post-closure monitoring. Each year the division requires Envirocare to revise the estimated cost needed for closure and post-closure monitoring. The revised estimate reflects changes in Envirocare's operations and the volume of material on site. The dollar amount held in the closure/post-closure account is adjusted accordingly. Envirocare's annual cost estimate is reviewed and approved by the division. A breakdown of Envirocare's most recently submitted cost estimate is shown in Figure II.

Figure II

As seen in Figure II, Envirocare estimates that it will cost $1,212,325 to close and monitor the site. Perhaps the most interesting aspect of the cost breakdown is the $172,302 to monitor the site for the next 100 years. Using the five percent rate of return value used to

calculate this amount means that $8,680 will be available each year for site monitoring. If, as required by the NRC, the one percent real rate of return is used, only $2,700 per year would be available.

### Recommendations:

1. We recommend the legislature call for a legal review of the DRC's licensing process for waste disposal facilities.
2. We recommend the DSHW consider basing the growth of its surety agreements with licensed facilities on an estimate of the actual funds needed for closure and post-closure monitoring.
3. We recommend the DRC review the estimated costs of closure and post-closure monitoring to determine the sufficiency of the funds held in trust. A part of this review should be the inclusion of a 1% real rate of return as per NRC rules.

## Compliance Programs Ensure License Stipulations

DSHW and DRC have developed license compliance programs to help ensure waste disposal operations controlled by the DEQ have sufficient safeguards for public health and safety. The emphasis of the compliance programs is to enforce the requirements set in the license agreements. Both programs appear to adequately enforce operator compliance with their respective licenses and both have received favorable critiques from the federal oversight agencies. Both programs also have violation identification programs that have addressed non-compliance issues during the license period.

DSHW's compliance inspection program conforms with the rules and regulations set up by EPA and the state. Their compliance program consists of on-site inspections, record review, and groundwater monitoring. A major emphasis of the DSHW compliance program is the identification and correction of license violations. DRC's compliance inspection program consists of daily routine on-site inspections, periodic inspections of records, and regularly scheduled monitoring and testing to confirm the monitoring and test results required of Envirocare. The **Utah Code** has empowered DRC to issue notices of violation and impose civil penalties if necessary.

### DSHW Compliance Inspection Program Aids in the Protection of Public Health and Safety

DSHW's compliance inspection program is the enforcement arm of the division's waste disposal program. The goal of the compliance section is to enforce the rules and regulations

outlined in division issued licenses and thereby protect public health and safety. Public protection is a result of on-site inspections, record reviews, and groundwater monitoring, all meant to identify possible license violations. If a violation is found the division can take enforcement action to compel compliance with license requirements. The compliance program also includes protection for the licensed operators. If a company disagrees with an enforcement action, it can appeal to the Solid and Hazardous Waste Board. Additionally, the program is closely monitored by EPA, which reviews the state's program to ensure it is in conformance with EPA guidelines as per the agreement between the state and EPA.

**DSHW's compliance staff have an on-going site inspection program.** DSHW's inspection process focuses on three main areas: (1) on-site inspection and observation of operations, (2) inspection of required records and documents, and (3) routine sampling and analysis of groundwater. DSHW conducts periodic inspections of all licensed facilities that treat, store, or dispose of hazardous waste. The inspection program is based on the terms and conditions outlined in the facility's operating license. Licenses are based on state and federal regulations. DSHW inspectors determine when and how often each facility will be inspected. While EPA requires federal facilities be inspected at least once a year, there are no EPA requirements for commercial facilities. Nevertheless, DSHW inspectors try to inspect each licensed facility once a quarter.

On-site inspections begin by assigning an inspection team to an upcoming inspection. The team, together with the Division Manager, is responsible for determining the scope of the inspection. The scope is based on a number of things such as allegations received from the public, past problems experienced by the facility, brief initial inspections by the team, or even areas of interest in the license itself. The team begins the inspection by conducting an on-site visit to observe operations, investigate allegations, and perform tests at the site. Inspectors feel that their on-site visits provide a presence which helps to ensure compliance. Inspectors also routinely monitor records and other documentation that facilities are required to maintain. Samples of reports and other documentation are routinely collected by inspectors. For instance, the inspector over USPCI requests hundreds of hazardous waste manifests which he reviews to ensure that USPCI is not receiving unauthorized waste.

Finally, inspectors routinely test groundwater samples to ensure that hazardous wastes are not escaping from disposal cells. In addition to the normal inspection process, when a new facility undergoes construction, inspectors review all plans and designs to ensure compliance with license specifications. They also review the physical construction of cells and require numerous tests and reports on the construction process.

**Compliance staff inspections and reviews identify license violations.** After an on-site inspection, review of records, or groundwater test, an inspection report is written by the inspection team and given to the Department Manager. The manager reviews the report to determine whether violations have occurred. If violations have occurred, there are four types of enforcement actions DSHW can take: (1) Warning letter: this occurs if the facility is close to a violation or if the violation is minor; (2) Notice of Violation: NOVs inform the company

of the violations it has committed, and when issued requests that a facility provide documentation, within a certain number of days, responding to the charge; (3)

NOV/Compliance order: a compliance order is issued at the same time with the NOV and orders the facility to come into compliance with the NOV; (4) Compliance order: a compliance order is based on a finding without assignment of an NOV.

For example, if a company renting from a landlord left waste on the land and departed without cleaning up the waste, an NOV would not be issued against the landlord because he did not create the problem; however, the landlord would be issued a compliance order to clean up the waste. Enforcement actions are reviewed by DSHW management, the staff attorney, and the Attorney General's office. If it is determined that a violation threatens public health, safety, or the environment, DSHW can revoke a company's disposal license.

If a company disagrees with an enforcement action, it can appeal to the Solid and Hazardous Waste Board and the board will make a ruling. If the board rules in favor of the company, the enforcement action is dropped. If the board rules in favor of DSHW, the director meets with the company to discuss violations and, if necessary, negotiate civil penalties. When DSHW management determines a violation to be of sufficient magnitude that a civil penalty should be imposed, DSHW management enters into negotiations with the company to determine the dollar amount of the penalty.

The State Legislature has not empowered DSHW to impose civil penalties. Therefore, DSHW, recognizing they are without statutory provision to assess civil penalties, negotiates penalties administratively. Negotiations usually follow a pattern where DSHW recommends a given amount and the company counters with a lesser amount. The dollar amount is negotiated back and forth until an amount is agreed upon. If negotiations are not successful DSHW can turn the case over to the Attorney General's office to file a law suit against the company or DSHW can appeal to EPA to take enforcement action against the company. Normally, however, enforcement actions and penalties are settled through the negotiation process.

Our review of the compliance section in DSHW indicated that the program conforms to established requirements of EPA and state regulations. Our samples of manifests and waste characterizations found no significant problems with operator record-keeping or documentation nor could we identify any discrepancy in shipping documents and testing performed by either the operator or the division. Part of the reason for this lack of discrepancies is that the program is so closely monitored by the EPA. The state has an agreement with the EPA outlining the state's responsibilities in administering DSHW programs and assuring compliance. Twice a year, the regional administration reviews all actions performed by the DSHW compliance section and offers comments and suggestions for change. In addition, DSHW cannot receive primacy in an area until it can prove to EPA that it can administer the area. The EPA reviews are important because as EPA increases its span of operations, it becomes possible for more responsibility to be turned over to the state. The compliance program is re-established each year through annual agreements between EPA and the state.

According to the Director of DSHW, the license application process generally includes a review by the compliance staff responsible for site inspections. However, several members of the compliance staff indicated they were not involved enough in the license writing process.

The compliance staff inspectors' perspective is one of strict enforcement of the regulatory process. At the same time management is often concerned with assisting industry in getting through the regulatory process in order to begin operations. As a result, there are often disagreements between the inspectors and management over how licenses should be written. For example, one inspector complained that he was not given the opportunity to review the USPCI Clive Incinerator permit until after the draft permit had been out for public comment. He indicated that it is very difficult to make any changes to a permit once it has been sent out for public comment. Even with this complaint, DSHW's permits have been well received by the EPA.

### DRC Compliance Program Protects Public Interests

DRC has a compliance inspection program to protect public health and safety by ensuring that radioactive waste disposal operations are carried out in accordance with NRC guidelines and other conditions contained in the division issued license. The compliance inspection program has three main parts: (1) daily routine inspections of disposal operations, (2) periodic inspections of required records, and (3) scheduled environmental monitoring and cell compaction tests. When inspectors discover violations of NRC guidelines or other conditions contained in the license, the operator is informed by a division issued notice of violation (NOV). If the violation is serious, DRC can impose a civil penalty in conjunction with the NOV to compel the operator to correct the violation.

DRC license compliance is based on the daily presence of DRC inspectors at the disposal site. It is felt that the routine presence of inspectors and conducting daily on-site inspections of Envirocare's operations is the best way of gaining compliance. Inspector observation and communication of those observations to the operator are the key functions of the inspection. Division inspectors frequently discuss their observations of the day's operations with the operator's site manager. The inspectors monitor incoming shipments, review manifests, examine disposal cells, take samples, perform safety inspections, and oversee operations at the site. If the inspector notices a problem or potential problem, he will discuss it with the site manager and determine a course of action.

In order to comply with the terms and conditions of their license, Envirocare is required to maintain records of their disposal operation. The license lists 54 requirements spelling out the terms and conditions Envirocare must meet. Many of the requirements require records to be kept documenting how compliance was achieved. DRC inspectors conduct periodic inspections of these records, some of which include:

Generator's identification of constituents contained in the waste

Envirocare's conformation of constituents contained in the waste

Environmental monitoring of soil, air, groundwater, vegetation, and wildlife

Verification that debris has not been placed in the bottom of cell

Determination of the moisture content of waste placed in the cell

Compaction tests showing compaction of lifts to 90 percent of standard density

Calibration of scales and other equipment

Compliance with OSHA safety standards

Employee training

Waste classification

Quarterly quality assurance audit performed by an independent auditor

Shipping manifests for each shipment received.

The two most critical pieces of information for public health and safety are the waste characterizations and shipping manifests. Waste characterizations identify the dangerous components and their concentrations in the waste while the manifests identify what was actually shipped to the disposal site.

In order to test whether or not the waste Envirocare disposes was actually within the limits specified by the license, we accompanied a DRC inspector on an inspection of the manifests and generator waste characterizations. At our request, 25 manifests and associated waste characterizations were selected by the DRC inspector for our test. We asked Dale Smith Consulting to review manifests and associated waste characterizations to determine: (a) whether waste shipments received at Envirocare fall within the concentration limits set forth in the license, (b) whether the generator's waste characterization appears to be accurate, and (c) whether the types of waste shipped from each generator appear reasonable or typical for the industry in which each generator operates. Dale Smith Consulting concluded:

> *The information in the manifests shows that, with the exception of waste received from Rhone-Poulenc, all the shipments were acceptable materials within the concentration limits of the Envirocare license. The characterization of the wastes appears to be proper in all cases. The wastes were typical of those generated by the shippers.*

## Monitoring Functions Are Also Necessary For Public Protection

Protection of public health, safety, and the environment goes beyond assurance by DRC that only proper materials are accepted by the site; monitoring the actual operation is also important. DRC and NRC guidelines require Envirocare to perform compaction tests of disposed material to document that there are no voids present in the cell and environmental

monitoring to document that the environment is not being jeopardized by site operations. Both monitoring systems have had problems in the past but now appear to be functioning.

**Compaction testing.** To monitor the results of Envirocare's compaction tests, DRC has contracted with an independent engineering firm to perform compaction tests on each completed lift. In February of 1992, DRC contracted with American Testing Laboratories to conduct compaction tests. Each 12-inch layer (lift) is to be compacted to 90 percent of optimum density. According to DRC staff, the lifts tested by American Testing have been compacted to 90 percent of optimum density. Prior to February 1992, DRC relied upon Envirocare's compaction test results and visual observation of the inspectors because the division did not have the capability to perform these tests.

**Environmental Monitoring.** The division does have the ability to adequately oversee environmental monitoring. DRC conducts its own environmental monitoring program which studies and documents radionuclide distribution and concentration levels in order to document the radiation levels in the environment, the changes in concentration levels, and the long-term trends resulting from disposal activities. The major emphasis of DRC's environmental monitoring plan is to document compliance with federal and state regulations. DRC's environmental monitoring program is comprises regularly scheduled sampling of ground water wells, vegetation, soil, air, surface water, work areas and property boundary areas. The samples are analyzed for appropriate radionuclides based on the radionuclides found in the disposed wastes.

We asked Dale Smith Consulting to review the environmental monitoring reports performed by Envirocare and the State to determine whether: (a) sampling results indicate that the environment is not being polluted and the public safety is not being jeopardized, and (b) Envirocare's sampling methods appear adequate, and (c) the Division's sampling methods appear adequate. Dale Smith Consulting concluded:

> *Envirocare's reported results meet prescribed limits for releases of radionuclides into unrestricted areas. Because the Envirocare facility is co-located with the Title I Vitro disposal site, origin of releases and consequent responsibility will be difficult to determine.*
>
> *The state environmental monitoring program appears to be adequate for independent confirmation of the licensee's reported values.*

**Penalties can be assessed for violations.** The **Utah Code** gives DRC authority to impose civil penalties and impound radioactive materials in the event of a license violation. Identification of violations begins with the compliance inspector who determines the nature and degree of the violation. The inspector's findings are reported to DRC management where it is decided whether or not a formal notice of violation should be issued. When the violation is of a sufficient magnitude, DRC imposes a civil penalty in conjunction with the NOV. The **Utah Code** authorizes DRC to impose civil penalties up to $5,000 per violation. Appendix E shows

the NOVs and civil penalties issued for license violations. Prior to 1990 DRC was not authorized to impose civil penalties.

Dale Smith Consulting reviewed the Notices of Violation (NOV) issued to Envirocare by the Division of Radiation Control to determine the seriousness of the cited violations and their importance to public health and safety. Dale Smith Consulting concluded:

> *For the 22 Notices of Violation (NOVs) reported since January 1990, 2 were Severity II, 13 were Severity III, 4 were Severity IV, and 3 were Severity V violations. Thus, over 2/3 of the cited violations were considered to have significant or highly significant safety or environmental implications. The preceding 25 NOVs were issued before the Severity classification was adopted. They appear to reflect the same degree of significance, although a specific comparison against the rules was not performed. Forty-seven cited violations in a 43 month period is an unusually high rate.*
>
> *Envirocare was cited and fined on two occasions for their inability to determine the radioactive concentrations in waste received at the facility (June 26, 1990, $5,000 paid; February 23, 1992, $8,500 proposed). These violations were properly considered as Severity II and III, since the concentration limits in the license are based on the control of exposure of on-site workers.*

(Note: the *waste received at the facility* referred to by Dale Smith were test samples furnished by the DRC as a test of Envirocare's ability to identify radionuclides in incoming shipments.)

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# Chapter IV
# DRC Management Needs Additional Policy Direction To Eliminate Controversy

Two issues cause much of the controversy surrounding radioactive waste disposal in Utah. First, some conflict exists within DEQ over how accommodating regulators should be in assisting the industry. This debate focuses on whether or not a disposal facility should be allowed to bring radioactive waste into the state before meeting all licensing requirements. Second, controversy exists over who should decide the types of waste that should be disposed of in the state. Industry competitors believe the Utah disposal facility is becoming a low-level waste disposal facility unfairly competing with their facilities due to actions of Utah regulators and the Northwest Compact.

Eliminating this controversy will not be easy because DEQ management is required to balance the needs of industry with protection of public health, safety, and the environment. However, there are a number of actions short of changing the statute that we believe will help. In our opinion, DEQ management needs to seek outside advice and approval from the DRC board and the Utah Legislature about major changes occurring in radioactive waste disposal licensing. Changing the types of waste brought into the state for disposal at the facility is a major policy decision that should be reviewed and approved by the board. The Utah State Legislature should also be advised about these policy decisions. We also believe that more clearly-drafted rules are needed to control the use of amendments and conditional permits within the DRC. In addition, we believe the board and the Utah State Legislature need to discuss whether adequate funds exist to protect the state's liability after closure. DEQ management stated the department's position on Envirocare has been articulated, from the beginning, to the public and the Legislature. Material received by Envirocare will be comparable to that of the remediated Vitro tailings and will pose no greater risk.

## The Nature of Envirocare Has Evolved Through License Amendments and the Conditional Permit

The use of license amendments and a conditional permit by the DRC have created controversy because the licensed facility has changed significantly without legislative direction. The result has been an evolution of the allowed operation of the radioactive waste disposal site from a low-activity NORM site to a low-level mixed waste site. Since the license was issued in 1987 there has been significant activity with the Envirocare license.

## License Amendments Have Altered the Original License

The original 1987 Envirocare license authorized the disposal of three NORM radioisotopes and limited one of those isotopes, Radium-226, to concentration levels below 2,000 pCi/g. License amendments since 1988 have, however, altered the license which now allows disposal of nearly 50 different isotopes. The DRC license issued to Envirocare has been amended 10 times since it was issued. In each case, the license amendment was a result of the licensee approaching the division. Most of the amendments were handled internally by the DRC before the creation of the board and without legislative direction. The major amendment changes did receive public comment through other divisions rather than the DRC. This is in direct contrast with the amendment system used by the DSHW that, with the approval of its board, has established rules to identify and control the use of license amendments. Any significant amendment needs legislative direction and procedures similar to those used by DSHW. Figure III lists the license amendments.

Figure III

Through the amendment process, Envirocare evolved from a NORM disposal facility into a low-level radioactive waste disposal facility. If Envirocare wanted to continue expanding its operation and increase the types and concentration levels of waste they could dispose of at the site, they could do it through the amendment process. This kind of expansion takes the issue of what kind of facility Utah will have from a legislative policy format to an administrative policy format. Currently, the constraints placed on the facility have been set administratively by the DEQ and by Envirocare itself, no constraints have been set statutorily. Envirocare's owner has submitted a statement indicating that he has no intention of receiving wastes beyond the health limits of class A materials. One control that can slow the process is the authority given the governor to stop any radiation shipments from outside the Northwest Compact from being disposed in Utah.

Examples of the growth and evolution of the facility include amendment 9 which authorized Envirocare to dispose of EPA-regulated mixed waste (radioactive waste containing hazardous constituents) and amendment 10 which continued the trend, authorizing Envirocare to dispose of NRC regulated low-level radioactive waste (source, byproduct, and special nuclear material). Physically, the mixed and low-level wastes are similar to the NORM waste Envirocare was originally licensed to dispose. The NORM materials consist of dry soils and small amounts of debris, as would the mixed and low-level wastes. However, the mixed and low-level wastes are subject to much more stringent regulatory requirements imposed by EPA and NRC because they can, by classification, be inherently more dangerous. The decision to allow this change was administrative.

There is no scientific reason why higher classifications of radioactive waste could not be disposed of at the Clive site. At the time of this report, Envirocare has applied for an amendment to add five additional radioactive isotopes to their license. The request is being reviewed by DRC. In addition, Envirocare has also applied to the NRC for a license to dispose of NRC regulated 11(e).2 radioactive material. The license application is being reviewed by NRC.

Such an evolution without legislative action is unprecedented in the other states with low-level disposal sites. In each of the other three states with low-level sites, state Legislatures reviewed and debated site plans before enacting legislation to allow the sites. However, in Utah, Envirocare's license has evolved without either legislative or board direction. The DRC board adopted existing administrative rules and did not participate in establishing division rules. The DSHW and its board have established rules to identify and control the use of license amendments, the DRC should do the same. There are three classes of modifications that can be made to an existing operating license. Each class requires the licensed facility to comply with different procedures before modifications can be approved. The classes are as follows:

> Class 1 is the simplest modification that can take place. It is used to keep a license current with routine changes to the facility or operation. The changes do not substantially alter the license conditions or reduce the capacity of the facility to protect

human health or the environment. Such a condition would be the way in which the dirt roads surrounding the facility are sprayed with water to keep dust

down. Under a class 1 modification, the facility may implement the changes without notifying DSHW but must notify them within seven days of implementing the changes.

Class 2 modifications are undertaken when there are variations in the types and quantities of wastes handled, technological advancements, or new regulations where changes can be implemented without substantially changing design specifications or management practices in the license. The requirements for obtaining this class are more stringent. The licensee must notify DSHW of their request, then publish the intent in a local newspaper. Next, a public hearing must be held in order to give the public a chance to comment on the modification.

Class 3 modifications substantially alter the facility or its operation. The requirements of this class are similar to a class 2 in that a modification request must be submitted to DSHW for their approval. If DSHW approves the request, the intent must be published in a newspaper and a public hearing held. The main difference between a class 2 and 3 modification is a time limit placed on the class 3 modification. Class 3 modifications, like new license applications, have a 270-day limit. In addition, class 3 modifications require the draft modification to be issued and public comments to be received before DSHW can issue the modification.

The DRC does not have the policy direction of its board in the form of administrative rules to direct license amendment actions. As a result, DRC does not have any policy directive for evaluating amendments. According to DEQ staff, from a scientific point of view there is no reason why Envirocare could not use the amendment process to increase concentration levels to the level of Class C waste. Geographically, Envirocare's location is similar to the Beatty, Nevada and Hanford, Washington sites. There are no regulations or policies prohibiting increases in concentration levels and science would probably support the notion that increased concentration levels could be disposed of safely under current NRC guidelines.

### Conditional Permit Followed NRC Part-61 Rules

The Envirocare facility has also been allowed to expand by the use of a conditional permit. While the permit requires Envirocare to follow Utah rules that incorporate NRC Part-61 guidelines, it still significantly alters the original license. The conditional permit has also become the focus of staff and industry attention because it places Envirocare's operations closer to those of a true low-level facility. Industry sees this as a competitive advantage and some staff see the change as favoring economic growth over public protection. Use of the NRC Part-61 based rules was a direct result of staff's desire to increase control over the license process, but the use of the guidelines was opposed by the DRC director.

The conditional permit is the core of the tenth license amendment and authorizes Envirocare's disposal of NRC regulated low-level waste. Because low-level waste is regulated by the NRC, the NRC insisted that DRC license Envirocare in accordance with requirements contained in NRC part-61 guidelines. Rather than waiting for all license components to be met

before issuing the final license, the DRC issued a conditional permit that both followed the requirements of NRC Part-61 and allowed Envirocare to proceed with its operations. The conditional permit authorized Envirocare to receive and store source, by-product, and special nuclear material, all of which are radioactive waste materials regulated by the Nuclear Regulatory Commission (NRC). Upon completion of conditions contained in the conditional permit, Envirocare would be authorized to dispose of the stored radioactive waste in permanent disposal cells. Staff concern over allowing storage of material before the facility had permission to dispose of the material was further elevated by their view that Envirocare had difficulty meeting the requirements of the NRC Part-61 review. DEQ staff felt they were being placed in the awkward position of writing up the reports for Envirocare and then reviewing their own work. Envirocare officials stated that staff in other divisions regularly write, approve and regulate licenses.

According to DRC staff, the director of DRC was opposed to conducting an NRC Part-61 review of Envirocare's license application. Staff said the director insisted that Envirocare's license could be amended without conducting a Part-61 review. Regarding this issue, the director stated that he believed a Part-61 review had already been conducted and that the addition of NRC regulated material did not constitute a need for further review of Envirocare's license. Additionally, the concentration limits of the NRC regulated material would offer no greater exposure than the limit already imposed by Envirocare's NORM license.

The DRC director felt that NRC Part-61 guidelines were intended to apply to low-level sites handling higher concentration levels of Class C material. DRC staff disagreed with the director over this issue. In staff's opinion, DRC was obligated to conduct an NRC Part-61 review because the entire nature of Envirocare's operation would be changed by the addition of NRC-regulated material. Envirocare would no longer be a NORM disposal site but would be a class A low-level disposal site. Staff stated that NRC guidelines make no exception based upon concentration limits and that disposal of NRC-regulated material required an NRC Part-61 license review. Officials from NRC became involved during this time and insisted that an NRC Part-61 review of Envirocare's license application be conducted. The director of DEQ agreed with NRC and ordered a Part-61 review.

The conditional permit is not an approved license; it is best described as a checklist of requirements that the applicant must meet before final approval of the license can be granted. DEQ staff often refer to the conditional permit as "A non-permit permit", meaning it is more like a list of things to do rather than a permit. The conditional permit issued to Envirocare only authorized Envirocare to store NRC-regulated material. It did not give Envirocare authorization to dispose of NRC-regulated material. In order to gain authorization to dispose of NRC-regulated material, Envirocare would have to comply with the NRC Part-61 requirements and the Division of Water Quality requirements contained in the conditional permit.

DRC staff were concerned that the conditional permit allowed material into the state for storage that was not yet approved for disposal in the state. They were concerned because the next step would be a license amendment for storage, yet there was an obvious lack of policy direction and rules to delineate what would be allowable. Unlike the DSHW, the DRC has not promulgated rules governing the use of license variances, so there are no established limits as to what is allowable or what staff must do to accommodate industry. Both the NRC and DEQ staff have objected to the conditional permit, believing it to be a poor regulatory action. DEQ management feels conditional permits are useful tools in the licensing process because such permits allow management to act as facilitators and bridge the gaps in the licensing process. DRC license amendments and the conditional permit have allowed evolution of the commercial site with only the two major license amendments being discussed in public meetings.

At times, DEQ management has used its exemption from the rules powers and its discretion to bypass certain regulatory procedures in order to help facilitate the needs of industry. Examples of these exemptions include the conditional permit itself, allowing private ownership of a radioactive waste site, and pooling of multiple violations to reduce fines. When this has occurred, some division staff members have felt that the regulatory process has been compromised. Utah statute and division rules do not address the use of conditional permits, but division rules allow management to make exceptions to the rules. DEQ management stated that state statute does not deny them the authority to use conditional permitting and that conditional permits are used only after it has been determined that public health and safety and the environment will not be adversely affected. There is no definitive answer as to legality of conditional permits in the radiation area nor has there has been any complete legal review of the conditional permitting issue.

Even though a conditional permit is a legal document, DEQ's legal counsel with the Attorney General's office stated that no one at DRC or DEQ asked him to review the conditional permit issued to Envirocare. As a result, he has not seen the conditions listed in the conditional permit and cannot comment specifically on them. However, he did offer his opinion regarding the proper use of conditional permits. A conditional permit may be appropriate but should contain only limited specific conditions and be issued only after the applicant has met the requirements of the licensing process, it should not be a "blank slate" handed to an applicant. He added that the specific conditions should be limited to those needed to fill in holes and complete gaps in the application which cannot be completed because of sequence or timing problems.

DEQ staff said that throughout the amendment process their roles changed from regulator to facilitator. They said DEQ management instructed them to assist Envirocare and help facilitate final approval of their license. Staff members stated that Envirocare appeared incapable of meeting the conditions of the permit without their constant supervision and help. The plans, reports, and other critical data submitted by Envirocare were incomplete and contained numerous inaccuracies. Several notices of deficiency were issued on nearly every report and document submitted by Envirocare. According to staff, because of deadlines

imposed by DEQ management, it became easier to do the work for Envirocare instead of issuing another notice of deficiency. The role of facilitator put DEQ staff in the position of writing, approving, and then regulating some of their own work.

In reference to the above conflict Envirocare officials stated:

> *Envirocare was very concerned at the repeated long delays and the unwarranted changes in the approach by the State. Envirocare felt that these long delays were caused by the lack of performance of the DEQ staff.*
>
> *Envirocare believes that it is customary for staff to review the applicants submittals and issue NOD's which in turn cause the applicant to respond and make appropriate corrections.*
>
> *In addition, other divisions regularly write, approve and then regulate licenses.*

The NRC experienced similar delay problems with Envirocare's application to dispose of 11e.(2) byproduct material. 11e.(2) material is a by-product of uranium mill tailing sites. Licensing requirements for disposal of 11e.(2) material are authorized solely by NRC. NRC staff conducted the review of Envirocare's license application to dispose of 11e.(2) material. In a response to a letter from the Director of the Office of Environmental Restoration and Waste Management asking the NRC to expedite their review of Envirocare's application, NRC stated:

> *To date, our experience with this license applicant [Envirocare] has not given us confidence that it can provide quality responses without extensive and time consuming interaction with NRC staff, which would delay the licensing process. The original application was rejected in the acceptance review stage as not having sufficient information to even begin a detailed review. Our February 6, 1991, rejection letter discussed the major deficiencies in the application. On June 4, 1991, we accepted Envirocare's revised application (dated April 30, 1991), but again found it necessary to issue substantial acceptance review questions. Its quality was such that we wrote …your application and ER (Environmental Report) are not of the depth or quality we expect from an applicant…*

Dale Smith Consulting's review of the conditional permit issued to Envirocare was fairly straightforward and determined that there was not sufficient information available to the DEQ to adequately determine Envirocare's abilities to meet the conditions of the permit so there was no basis for assuming the required findings could be made to grant approval. According to Smith, public health and safety is protected by the permit but the applicable rules and regulations were not followed. Further comments for this area may be found in Appendix A.

In reference to Dale Smith Consulting's review of the conditional permit, we feel it is important to emphasize that Mr. Smith is a retired NRC administrator. While with the NRC, Mr. Smith lead the multidisiplinary team that developed 10 CFR Part-61 guidelines, *"Licensing*

*Requirements For Land Disposal of Radioactive Waste"*. These guidelines,adopted by the state, do not contain provisions for the issuance of conditional permits. Mr. Smith shares NRC's position that the requirements of the adopted guidelines should have been completed before any waste was shipped to Utah.

According to DRC staff, concern for business needs appeared to be a major justification of the conditional permit and, at times, appeared to be a greater concern than following established procedures, whereas DEQ management felt this decision was economically based but did not harm public protection. The economic benefit to Envirocare was clear. DEQ staff said Envirocare did not want to go through the delay of having a final, complete permit before they could begin marketing their facility's ability to dispose of source, by-product, and special nuclear material. In staff's opinion, if management had not issued the conditional permit, the delay would have cost Envirocare money and the possible loss of clients. As soon as Envirocare received the conditional permit, they began marketing their facility and shipments of NRC-regulated waste began showing up immediately thereafter. Figure IV lists some of the requirements contained in the conditional permit that were unmet when Envirocare began receiving NRC-regulated waste.

Figure IV

The NRC also disagreed with the use of a conditional permit. While NRC disagreed with DRC management's philosophy behind the conditional permit, DRC had the authority to issue a conditional permit; therefore, no action was taken against the state by the NRC. NRC officials believed that DRC should have required Envirocare to meet all licensing requirements contained in NRC Part-61 before they were allowed to ship waste into the state. In their opinion, Envirocare should have been required to demonstrate that their cell was safe, that they had the knowledge and expertise to handle NRC-regulated material, that they would not pollute the environment, and that there was no danger to public health and safety before any permit was issued. NRC does not issue conditional permits nor do NRC guidelines provide for the issuance of conditional permits. Their concerns about the use of conditional permits are expressed below.

> *Normally, issuance of a license for disposal of low-level waste indicates that the applicant has demonstrated that the potential impacts to off site individuals through any combination of exposure pathways will not exceed specified regulatory limits. This does not appear to be a supportable licensing conclusion given the extent and magnitude of the unresolved technical issues.*
>
> *NRC identified the following examples where Utah noted or alluded to major deficiencies in the license application. These are deficiencies that are so broad in scope that it is difficult for staff to understand how a license could be issued pending their resolution.*

DEQ management disagrees with the position taken by NRC and Dale Smith Consulting, stating the department has issued conditional permits through the Division of Solid and Hazardous Waste for other disposal facilities and found conditional permits to be very helpful in clarifying the specific requirements which must be met. According to DEQ management significant analysis had been performed to support issuance of the conditional permit. DEQ's director stated that the protection of public health and safety is the department's number one priority and the issuance of conditional permits in no way compromised public health or safety. In response to NRC's concerns, the director of DEQ stated in a letter dated June 21, 1991:

> *Your concerns raised over the issuance of a conditional permit are unfounded. No wastes will be placed into the site until all of the conditions are met. We have found conditional permits to be very effective in completing the permitting process through clearly defining specific items that must be completed before the facility can be operated or constructed. It is a common practice in many states and with EPA. We have developed contingency plans, including funding provisions for the return of the radioactive waste received in the event that the license conditions are not met.*

Our review found, however, that emergency permits and temporary authorizations issued by the DSHW are for special circumstances. Emergency permits are issued when hazardous waste unexpectedly poses a danger to public health, safety, or environment. Temporary

authorizations are issued to allow temporary changes to a facility's license for unexpected reasons. The use of emergency permits and temporary authorizations follows set procedures

set by administrative rules and is sanctioned by the EPA. DSHW's use of emergency permits and temporary authorizations does not appear to be similar to DRC's use of a conditional permit.

## Waste Disposal Industry Questions
## Utah DRC Actions

The commercial disposal of radioactive wastes is a highly competitive industry strongly regulated by state and federal statutes. The creation of a NORM site in Utah and its subsequent growth and evolution has raised concerns within the waste industry because it is unique to the industry. Envirocare began with wastes that did not fall under the control of any regulatory statute and then, as the site became more established, began amending its license for other wastes. The radioactive waste disposal community is concerned that Envirocare will have a competitive advantage because it is not required to collect the fees required at other sites. They claim further advantage has been granted Envirocare by giving them proprietary rights to all private waste generator documents that is not given to any other disposal operator. They argue that competitive advantage not only harms the competitors within the industry but also undermines the purpose of the compact system established by the NRC. A compact site operator believes Envirocare has been given a competitive advantage and has filed suit against the Northwest Compact, the Utah DRC, and others. The goal of the suit is to prove the compact system and Envirocare have created a situation of unfair competition which forces one facility to charge high state and compact fees while another can undercut costs to generators because these fees are not required.

### Compact System Developed for Low-level Wastes

The compact system was initiated because there was a lack of low-level waste facilities in the U.S. In 1980, only three licensed low-level radioactive waste disposal sites existed within the United States: Hanford, Washington; Beatty, Nevada; and Barnwell, South Carolina. At that time, it appeared these sites would soon reach their maximum capacity and face closure. In response to the threatened closure of these sites, Congress passed the Low-Level Radioactive Waste Policy Act of 1980. The 1980 act encouraged all states to develop their own radiation control programs and to form regional compacts for the purpose of managing low-level radioactive wastes and developing new disposal sites. As a result, a number of states combined to form regional compacts. The Hanford, Washington site joined the Northwest Compact, the Beatty, Nevada site joined the Rocky Mountain Interstate Compact, and the Barnwell, South Carolina site joined the Southeast Interstate Compact. Regional compacts with established low-level disposal sites are referred to as "sited regions." States that have not joined compacts and regional compacts without disposal sites are referred to as "unsited states or unsited regions."

Under the terms of the 1980 act, sited regions could deny entry of low-level radioactive waste shipments from unsited states and unsited regions to their low-level sites beginning January 1, 1986. This provision of the 1980 act was designed to encourage unsited states and unsited regions to develop their own low-level disposal sites. However, in 1985 it became apparent that no new low-level sites would be developed by the 1986 deadline. Therefore, Congress worked out a compromise solution and passed the Low-Level Radioactive Waste Policy Amendments Act of 1985. The 1985 act allowed sited regions to accept waste shipments from unsited states and unsited regions through December 31, 1992. The 1985 act also authorized sited states to impose surcharges of $40 - $120 per cubic foot on out-of-region waste shipped to their disposal site. After the December 31, 1992 deadline, sited regions can ban shipments from outside their region to their low-level sites.

Utah is a member of the Northwest Compact whose other members include Alaska, Hawaii, Idaho, Montana, Oregon, Washington, and Wyoming. Members of the Northwest Compact have recognized that low-level radioactive wastes are generated by essential activities and services benefiting the citizens of the states. They have also recognized that the protection of public health and safety and the environment is of paramount importance. As a result, member states have determined that cooperation between the states will result in the most safe, efficient, and economical method of managing low-level wastes. In order to minimize the amount of handling and transportation required to dispose of such wastes, the compact system was established to pool state efforts in disposing of low-level wastes. Currently, the Hanford, Washington site serves the low-level disposal needs of all Northwest Compact member states. Each member state has agreed to adopt practices which will require low-level waste shipments originating within its borders and destined for a facility within another party state to conform to the applicable packaging and transportation requirements and regulations of the host state.

The Hanford, Washington site is operated by U.S. Ecology, Inc. The Washington Department of Ecology is responsible for regulating operations at the site. After the Hanford site reaches maximum capacity and is closed, another member state of the Northwest Compact will take its turn as host state for a new disposal site. In theory, each member state of the compact will eventually have a turn as the host state for the region's disposal site. When the Hanford, Washington site is closed, each member state will submit a proposal for the location of the new site. The Northwest Compact Committee will determine the most suitable proposal.

The state of Washington currently imposes a $40 per cubic foot surcharge on waste received from states outside the region that have met milestones for developing their own radiation control program as set forth in the 1985 Act. A $120 per cubic foot surcharge is imposed on shipments from states that have not met the established milestones. A portion of the surcharge goes to states within the Northwest Compact to help them develop their radiation control programs. The remainder of the surcharge goes into Washington State's general fund and is used to build up the closure/post-closure account and to finance other state projects. The surcharges are designed to compel non-sited states and regions to build their own disposal facilities and develop their own radiation control programs.

## Envirocare Should Not Compete With Compact Sites

In theory, Envirocare should not be in direct competition with any compact site for any wastes. In practice, proving there is no direct competition is difficult. The wastes disposed of by Envirocare should be different from compact wastes, but Utah has allowed Envirocare proprietary rights over contract information that would prove what kinds of waste Envirocare accepts. Some information is available to the Northwest Compact, but industry competitors do not see it as full disclosure. This question of competition has become a major issue of discussion within the Northwest Compact and within the industry.

The Northwest Compact approved Envirocare's operation as a NORM-only site. On May 28, 1992, the Northwest Compact Committee issued a resolution approving Envirocare's operation within the region. The committee determined that Envirocare served an important national purpose in accepting for disposal bulk, large volume materials slightly contaminated with very low concentrations of radioactivity. Moreover, the committee determined that the waste disposed of at Envirocare is basically different from the waste typically disposed of at the Hanford site and, therefore, the Envirocare site does not compete with the Hanford site. Envirocare agrees with this position. In order to ensure that Envirocare does not compete with the Hanford site, the resolution restricts Envirocare to receiving the large volume slightly contaminated soil and debris wastes outlined in Envirocare's license.

Envirocare is required to submit to the committee a monthly disposal report of all shipments including the kind of waste, waste form, total waste volume, average concentration level, and state of origin of each shipment. The committee has retained the right to modify or rescind its authorization at any time. Other operators, however, are required to have an open document policy that allows state regulators to know who the waste generator is and how much the generator is paying. Envirocare has, by state statute, been granted proprietary rights over some information. Industry competitors see this as another example of a competitive edge given by the Utah DRC.

On March 10, 1992, U.S. Ecology filed a lawsuit against the Northwest Compact, the Compact Committee members, the Washington Department of Ecology and its director, the Utah Bureau of Radiation Control and its director, and the NRC and its chairman. In the suit, U.S. Ecology contends that the Envirocare site does compete with the Hanford site, that some waste shipments going to Envirocare should be going to Hanford, and that the surcharge imposed on out-of-region waste shipments received by the Hanford site should be waived or that they are illegal because Utah, as a Compact state, does not impose a similar surcharge on out-of-region shipments to Envirocare.

U.S. Ecology told us they originally supported the establishment of Envirocare and did not file suit until Envirocare's license had been substantially altered by the amendment process. U.S. Ecology contends that even though Envirocare can only accept class A wastes, with the latest amendment, these are materials that before could only be disposed of at a

compact site. A compact site having to collect a per cubic foot fee cannot possibly be competitive with Envirocare. At the time of this report, the lawsuit filed by U.S. Ecology is still pending.

U.S. Ecology is not alone in its concern with Envirocare and DRC activities. During the course of this audit a number of Envirocare competitors voiced concern with the actions of Envirocare and the Utah DRC. Competitors in Washington, Wyoming, Colorado, and Texas attempting to establish NORM-only sites have complained of Envirocare's actions to prevent site approval.

## Additional Policy Direction May Help Eliminate Controversy

Both staff and industry concerns are related to the lack of definitive policy direction. Currently, DRC policy is set by DEQ administrators who must balance their roles as regulator and policymaker. Policy control is possible, however, at two other levels: the state Legislature and the governor-appointed policy boards. Both of these levels take policy decision-making into the public arena where it is easier to cope with political pressure. At the same time, DEQ administrators are freed to address their duties as regulators.

The Legislature feels some responsibility for policy relating to disposal of wastes within the state and has attempted to control and limit the disposal of hazardous and radioactive wastes in Utah. Additionally, statutes have added to or strengthened the powers of governor-appointed boards. These controls, however, have had little effect on the existing facilities. In the case of Utah's sole licensed radioactive waste facility, the operation has expanded through use of license modifications and amendments without the oversight of the legislature or the appointed board. According to DEQ:

> *Waste disposal is a very profitable business promoting a great deal of interest and activity from those industries involved and by interested legislators and individuals concerned for either the business or the environment.*

### Legislative Action Has Shown Some Policy Control Is Desired

The most noteworthy example of legislative policy-making is the moratorium on the construction of new sites. **Utah Code** 19-3-105 prohibits licensing or permitting new sites without the approval of both the governor and the Legislature. This is not the only measure taken by the Legislature to control the governing policies of hazardous and radioactive waste management.

Along with taking the position to maintain EPA guidelines, the Legislature has also taken a strong position in establishing fees for the Division of Solid and Hazardous Waste (DSHW).

Here, the Legislature has set state policy on the acceptance of out-of-state wastes by setting the per-ton fee structure used by DSHW. This legislative action really sets two policies. First, it establishes a funding source for the state's hazardous waste program by making the generators of waste pay not just for disposal but also for the state supervision of the disposal. Second, it is a step toward a limitation of wastes entering the state.

While the Legislature has shown interest, its level of involvement has not been consistent from one DEQ division to another. The legislature has recently established a $2 per ton fee to replace the DRC's license fee. This fee should amount to about $200,000 per year and is sufficient to reimburse the state for the cost of site supervision. Waste disposal fees in excess of state costs were discussed before the Legislature but were not imposed. Our review of this area has also shown that other states with radioactive waste disposal sites charge per-ton or per-cubic foot fees that far exceed the cost of site supervision. The Legislature's action to only charge for cost reimbursement has added to the concern that radioactive disposal facilities are treated differently in Utah.

The Legislature has also set forth in the **Utah Code** guidelines for siting hazardous waste facilities and for the actual application information, fees, and filing requirements. Each of these steps is meant to insure a higher quality, safer facility but does not in any way limit the size of or the wastes received by the facility. The Legislature has never clearly established what it wants in the way of waste disposal facilities, particularly radioactive waste disposal facilities. Rather, the Legislature has assigned that task to a governor-appointed board of citizens with some technical expertise in each of the department's functional areas.

## Policy Boards Have Been Beneficial

Policy boards have been of benefit to the DEQ because they allow a separation of policymaking and operations freeing administrators from some political pressures. Legislature-established policy boards are meant to place difficult policy decisions in the hands of people who represent public interests. Ideally, these are people with technical expertise. Additionally, these boards are meant to defray the negative effects of political pressures on the department and its staff. The boards' structures are of a standard format with appointments made by the governor with the advice and consent of the Senate. Board members are from a fairly divergent population to assure impartiality and each serves for four years in a rotating scheme to protect board memory.

While similarly constructed, each of the department's boards is not empowered with the same statutory authority. This means that some do not have the policymaking ability of their departmental counterparts. An example of a board empowered with greater policymaking ability is that of the Division of Water Quality. State statute allows the board to adopt, modify, or repeal standards of water quality, to make rules and develop programs, and to review plans and specifications. The statute establishing the Solid and Hazardous Waste Board is very similar to Water Quality's statute.

Solid and Hazardous Waste is similar to Radiation Control in that, as a division, it also licenses the disposal of waste. The DSHW Board, however, has far greater power over the operation of the waste site because of specific language in the statute (**Utah Code** 19-6-105) identifying the board's power to make rules governing hazardous waste disposal facilities. This board is also granted judicial power to enforce the rules it sets for waste handlers.

The statute for the Division of Radiation Control is not as extensive in its description of board powers. **Utah Code** 19-3-104 grants the board the ability to license facilities if significant health hazards are evident. It further empowers the board to define the rules for determining significant health hazards, establish siting criteria, review applications, and issue notices of completeness and violations. The statute does not contain any language specific to disposal operations nor does it allow for any judicial control of such operations. The DRC statute further reduces control by allowing the board to define rules rather than make rules, as allowed in the DSHW statute.

## DRC Board Is Not Well Utilized

The DRC board was established in 1991 to reduce the political pressures placed on the division's administration and staff but has not been wholly successful. The board's first meeting was in September 1991 and began with an introduction and explanation by a member of the Attorney General's Office of the new board's duties. It was explained to the new board members that their purpose was to separate the legislative and administrative powers given to the Division of Radiation Control. The board would set the rules and regulations while the division's administration would apply those rules and regulations to the division's operations.

As a new board without any history, it has had problems establishing an identity separate from the department and division administrations. The board faced problems from its first meeting when two members were dismissed and one latter reinstated. The resulting confusion as to who has authority over the board has reduced the effectiveness of the board's policymaking ability. Along with diminishing the board's use as a policymaker, the confusion places the administration in the middle of a political battle; in this case, between environmental groups wanting representation on the policymaking board.

Board members interviewed in the course of this audit mirrored this concern, stating that the board had not been involved in any major decisions. In fact, one board member told us that a number of the scheduled board meetings had been cancelled by the division director with no explanation. The board has gone as long as five months without a single meeting (statute calls for a minimum of quarterly meetings). When they have had meetings, there have been very few votes and what votes there have been were of an advisory nature. The board has never really discussed its role in setting policy.

The lack of board consultation or inclusion in the decision-making process is best seen in the DRC's waste disposal permitting process. The current amendment and conditional permitting process has allowed major changes in the program's direction without either

legislative or board approval. Board members told us in interviews that they have never been informed of any actions dealing with the radioactive waste disposal site. They were unaware of some permit changes and amendments. The lack of information given to theboard, according to the DRC, is a result of the board's lack of experience. This lack of experience may be affecting the board's abilities but we also see very little effort on the part of DRC to train the now over one-year-old board.

### Recommendations:

1. We recommend the Legislature include statutory wording similar to that of the DSHW, to direct DRC policy decisions to the DRC Board.
2. We recommend the Legislature direct the DRC Board to review the licensing of radioactive waste disposal sites and submit a policy stating what kinds and concentration levels of waste are acceptable and what kind of facilities Utah should have.

## State Liability For Waste Sites Is a Significant Factor

One of the most significant issues in need of state policy development is that of state liability for state permitted and licensed disposal sites. While site surety for closure and post-closure monitoring has been addressed, liability has not been thoroughly addressed. Neither state nor federal agencies have addressed post-closure liability for waste disposal sites, possibly leaving a large gap in the system. While the debate continues over legal liability, nearly everyone agrees that government, in the long run, will be responsible for these sites after they are closed. Along with that responsibility comes liability: should a private operator fail, government may have to take over.

The primary areas of concern are in site ownership and the effect of ownership on state liability and overall state liability for the site should the site operator become insolvent. Site ownership is a concern because there is no consensus as to whether private or public ownership is more beneficial to government. On this issue, even the NRC and EPA take completely different stances. Within liability are questions as to sufficiency of funding for operational accidents and site closure as well as the question of post-closure liability.

### Site Ownership Is an Issue With Federal Agencies

Site ownership is an issue because it revolves around the question of site responsibility after the cells have been sealed and operations have ceased. While the question of ownership

addresses legal responsibility, should all other sources fail, state responsibility has never been questioned. Should problems occur and the legal owner be unable to fund corrective action,

public funds may have to be used to protect public health and the environment. Given the long life of the toxicity of radioactive and hazardous wastes, failure and lack of private funds are possibilities.

Both the EPA and the NRC believe that post-closure ownership of waste disposal sites is important but their views as to who should own the property diverge. The EPA requires any disposal site with RCRA wastes to be privately owned and maintained. The reasoning is that the waste site operator retains all responsibility for site liability. If the operator is unable to handle the financial responsibility, EPA doctrine requires the waste generators with wastes at that site to be financially responsible.

NRC rules are exactly the opposite as they question whether or not the operator or generators will exist as viable entities 20, 50, or 100 years in the future. The NRC requires what it calls institutional ownership of sites in post-closure. The logic here is that private companies do not exist for the long periods of time necessary for radioactive materials to breakdown. Government ownership allows immediate access to the site and governmental responsibility should anything happen. In the long run, either governmental or private ownership may be inconsequential to governmental liability because the time involved is so long it is difficult to expect the businesses involved will continue to exist or that technologies will remain the same.

Post-closure ownership has been debated heavily in Utah since the radioactive waste site opened. The NRC believes in institutional control of the site after it is closed, with the state or federal government obtaining title to the property. Utah's DRC, however, decided that the EPA approach of maintaining private ownership and thus private liability was preferable. Because of this preference, the DRC exempted the Envirocare site from its rules requiring institutional ownership. Such an exemption is allowed within the DRC's rules. This was considered a moot point because NRC thinking, like that of the EPA, is that properly designed waste containment cells will not allow contamination, making liability low. Both NRC and EPA treatment of sites in the post-closure period make the assumption that nothing will go wrong during or even after the monitoring period.

### Liability Is a More Important Issue to the State

Who is liable for any possible problems in the future is a far more important question than who owns the site. EPA's superfund site experience shows that years after a site is closed, government ultimately accepts some of the liability. A worst-case scenario of a ruptured or breached containment cell is considered an anomaly that will not happen but potentially could happen. Utah's programs mirror federal thinking that a worst-case scenario will not happen and require that only enough funding exist for post-closure monitoring by a third party. Other states see the possibility of problems differently and are assessing fees to protect themselves. Utah evidently also sees some problems and does require liability coverage while its sites are operating and requires funding of post-closure monitoring.

State liability is reduced significantly during site operation and closure because the state's licenses and permits require some financial surety as a license stipulation. Financial surety accounts have been established for the closure and post-closure monitoring of disposal facilities in Utah. The accounts are dedicated strictly for this purpose; funds cannot be withdrawn from the account without approval from DEQ. Utah's closure/post-closure accounts only contain enough money to close and monitor the site.

Liability for Utah's radioactive disposal site is based on information required by NRC guidelines. In accordance with NRC guidelines, the DRC requires operators of radioactive waste disposal sites to submit a detailed closure and long-term maintenance plan. The plan must contain specific analysis of geologic, hydrologic, or other disposal site data pertinent to the long-term containment of emplaced radioactive wastes. It should also contain the results of tests, experiments, or other analyses relating to closure and sealing of the site. The division requires long-term maintenance and monitoring of sites for 100 years after closure. As part of the closure and long-term maintenance plan, the division requires site operators to provide assurances that sufficient funds will be available to close and monitor the site. The division's rules specify:

> The applicant shall provide assurances prior to the commencement of operations that sufficient funds will be available to carry out disposal site closure and stabilization, including: (a) decontamination or dismantlement of land disposal facility structures; and (b) closure and stabilization of the disposal site so that following transfer of the disposal site to the site owner, the need for ongoing active maintenance is eliminated to the extent practicable and only minor custodial care, surveillance, and monitoring are required. These assurances shall be based on bureau approved cost estimates reflecting the bureau approved plan for disposal site closure and stabilization. The applicant's cost estimates must take into account total costs that would be incurred if an independent contractor were hired to perform the closure and stabilization work.

Accordingly, the division has required Envirocare to deposit approximately $1.2 million in a surety trust account to fund the cost of closing and monitoring the site. It should be noted, however, that this amount should be based on the approved cost estimates in the approved closure plan. The surety trust account has been accepted by the division and reviewed by the NRC. Funds deposited in the account are dedicated solely for closure and post-closure monitoring and cannot be used for any other purpose. The funds cannot be withdrawn from the account without authorization from the division. Each year the division requires Envirocare to revise the estimated cost needed for closure and post-closure monitoring. The revised estimate reflects Envirocare's expanding operations and the increased volume of material on site. The dollar amount held in the closure/post-closure account is adjusted accordingly.

Radiation control departments in other states with low level radioactive disposal sites also require site operators to set aside funds in closure/post-closure accounts. However, other states require site owners to maintain much larger dollar amounts in their accounts than Utah's Division of Radiation Control. Radiation control departments in these other states have built

up their closure/post-closure accounts by imposing a fee on radioactive waste disposal within the state. South Carolina collects $2.80 per cubic foot, Nevada collects $2.00 per cubic foot, and Washington collects $1.75 per cubic foot for this purpose. Figure V shows the dollar amount currently held in each state's closure/post-closure account and the amount of the fee imposed per cubic foot of waste disposed.

Figure V

Representatives from the radiation control departments in the other states with low level disposal sites said their closure/post-closure accounts are intended to do more than just fund closure and post-closure monitoring of disposal sites. These accounts are also intended to protect the state from high clean-up costs that could result from unforeseen problems occurring after closure. Conceptually, these closure/post-closure accounts are likened to an insurance policy designed to help protect the state by reducing the state's financial risk for operator default, future changes in science and technology, and catastrophic events.

Requiring fee payments for a closure/post-closure account may be a reasonable method of reducing state liability should problems occur in the future. This sort of account goes beyond the existing post-closure surety fund and becomes a contingency should a true worst-case scenario occur. Such an account also eliminates debate over the need of public or private ownership because the issue of who pays is already decided. As demonstrated above, such a program is not unprecedented, as other states have already instituted such plans. Utah currently has the basis of such a program in its post-closure monitoring program.

Utah's programs have some liability protection already built into license agreements with the disposal sites. Maintenance of a fund is required to guarantee disposal sites will be fully closed no matter what happens to the disposal operator. These funds also exist for costly leaks or spills during operation and for the long-term monitoring of the site once it has been closed. Hazardous and radioactive waste disposal sites are required to maintain some form of insurance to cover any sort of problem that might occur during site operations; a variety of

funding methods are allowed. A hazardous waste spill and the resulting cleanup can be extremely costly. This requirement insures funding will be available.

Both radioactive and hazardous waste sites also require, in addition to the closure fund, a fund of a sufficient amount to cover the cost of post-closure maintenance and monitoring. The EPA requires this fund be sufficient to maintain and monitor RCRA sites for 30 years and the NRC requires Part-61 sites have funds sufficient for 100 years of monitoring. While it appears that the coverage is adequate for these costs, it does not appear that coverage is adequate for major repairs.

DRC administrators said there is only enough money in Envirocare's closure/post-closure account to close and monitor the site and nothing more. If it should become necessary for the state to close the site, the $1.2 million in account will cover the cost of hiring an independent contractor to dispose of waste in storage, close and cover disposal cells, decontaminate the site, and provide long-term maintenance and monitoring. The division has not required additional money to be set aside to protect the state from costs that might result if unforeseen problems were to occur. A fee has not been imposed to build-up the closure/post-closure account.

The director of the Division of Radiation Control indicated that a fee for the purpose of building up the closure/post-closure account has not been imposed because the division has not been empowered by the Legislature to do so. He also said a fee has not been imposed because the division follows NRC guidelines and NRC does not impose fees. Responding to this statement, NRC officials said they did not impose fees because they are strictly a regulatory oversight entity without such powers. However, they pointed out that states have the power to impose fees and that all of the other states with low-level disposal sites impose fees. They said it is strictly up to each state's Legislature whether or not fees are imposed.

Lack of fees to cover catastrophic events is not solely a radioactive waste problem. For RCRA hazardous waste cells, the design and monitoring requirements do not address costs for cell breaches or other catastrophic accidents. As an example, Utah's hazardous waste site has $4.8 million for closure/post-closure; $3.6 million is estimated as the cost of closure. Only $1.2 million is left to cover monitoring and maintenance in addition to any major problems that would require rebuilding the cell.

A study of hazardous waste disposal conducted by the state of South Carolina stated, "The risks for many potential environmental occurrences (e.g., liner leak) continue after closure and are not covered by typical post-closure assurances." According to representatives from both the EPA and DSHW, there are concerns nationwide that there is not enough money in post-closure trust funds to cover catastrophic events.

South Carolina's study also indicated that assurances for such liabilities should be made after closure. However, they were unable to locate any insurance company willing to extend coverage beyond the closing date. The reason for this unwillingness was the "inability of the industry to adequately assess the potential risk of loss resulting from an occurrence significantly in the future that requires both remedial action in and around the disposal site...". The study recommended a state-administered fund be established. South Carolina has followed

this recommendation and now has a fund of $113,000,000 for its hazardous waste program and, as shown in Figure V, $53,000,000 for its radioactive waste program.

There is little beyond South Carolina's study to demonstrate that unanticipated accidents could happen in cells designed for hazardous wastes. This is because no facilities have been in post-closure long enough to be a problem. NRC controlled cells, such as those used in Utah, are also relatively new and in theory have a 1,000-year design life. It is a question of whether to trust the systems as they are designed or prepare for an unlikely contingency.

### Recommendation:

1. We recommend the Legislature statutorily address the type and level of radioactive waste disposal facilities allowed to be licensed within the state of Utah.
2. We recommend that a legal review be performed addressing the use of conditional permits within DRC.
3. We recommend the DRC Board review state liability for the disposal site to determine the need for additional surety funding and post-closure liability funding. The board's findings and recommendations should be forwarded to the Legislature.
4. We recommend the Legislature consider statutory inclusion of waste disposal fees for possible funding of site surety and liability accounts.

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# APPENDICES

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## Appendix B

## Requirements Contained In The Safety Evaluation Report and Environmental Assessment

| Safety Evaluation Report | Environmental Assessment |
|---|---|

Site Characteristics
- Site Location
- Population
- Climatology
- Geologic
- Seismic
- Groundwater

Design and Construction
- Accident Considerations
- Construction Methods
- Construction Equipment

Facility Operations
- Receipt of Waste
- Inspection of Waste
- Waste Handling/Storage
- Disposal Operations
- Environmental Monitoring

Site Closure
- Surface Design
- Erosion Protection
- Geotechnical Stability
- Decontamination
- Environmental Monitoring

Safety Assessment
- Radionuclide Release
- Release of Radioactivity
- Long-Term Stability

Occupational Exposure
- Radiation Sources
- Radiation Protection

Financial Assurance
- Assurance Plan

Proposed Action
- Location
- Description of Facility and Design
- Disposal Operations
- Environmental Monitoring
- Site Closure
- Financial Assurances

Affected Environment
- Land
- Meteorology/Air Quality
- Ambient Radiation Levels
- Hydrology
- Geology
- Ecology
- Socioeconomic

Environmental Consequences
- Land
- Meteorology/Air Quality
- Hydrology
- Geology
- Ecology
- Socioeconomic
- Radiological Impacts and Dose Assessment
- Effects of Accidents
- Land-Use Plans Policies
- Unavoidable Adverse Environmental Impacts
- Irreversible Commitments of Resources

**Appendix B (Continued)**

**Site Characteristics**: The applicant is required to provide information on the natural and demographic characteristics of the site and vicinity. The information should include descriptions of the geologic, geotechnical, hydrologic, meteorologic, climatologic, and biotic features of the disposal site and vicinity; present and projected population distribution and land use; and site activities and controls. The applicant is required to explain how these site characteristics have influenced facility design and operating criteria and should show the adequacy of the site characteristics with respect to the long-term performance of the waste disposal system.

**Cell Design and Construction**: The applicant is required to describe the principal design features of the facility that are designed to provide long-term isolation of disposed waste, minimize the need for continued active maintenance after site closure, and improved the site's natural characteristic in order to protect public health and safety. Principal design features should be identified and described for each of the following 11 functional requirements: (1) minimizing the infiltration of water into disposal units; (2) ensuring the integrity of disposal unit covers; (3) providing for the structural stability of backfill, waste, and covers; (4) minimizing contact of waste with standing water; (5) providing adequate site drainage during operations and after closure; (6) facilitating site closure and stabilization; (7) minimizing the need for long-term maintenance; (8) providing a barrier against inadvertent intrusion; (9) maintaining occupational exposure as low as is reasonably achievable; (10) providing adequate disposal site monitoring; and (11) providing an adequate buffer zone for monitoring and potential mitigative action.

**Facility Operations**: (1) Receipt and inspection of waste: The applicant is required to describe the procedures or contracts in place ensuring that arriving shipments comply with applicable Federal regulations and waste acceptance criteria that might be incorporated into the disposal facility license as conditions. These regulations and acceptance criteria should govern the acceptability of waste packages for routine handling operations and for long-term disposal. (2) Waste handling and interim Storage: The applicant is required to provide information on the waste handling and interim waste storage operations to be performed at the disposal facility following acceptance and receipt of the waste packages. The applicant should describe the operations in sufficient detail to demonstrate that the waste will be handled safely and stored in a manner that will prevent contact of water with the stored waste… (3) Waste disposal operations: The applicant is required to present information on all the waste disposal operations and procedures beyond waste handling and interim storage from the actual emplacement of the waste into the individual disposal units up to closure and stabilization operations in the individual units. The applicant should discuss site closure operations pertaining to, for example, final site grading across several disposal units to ensure the proper handling of surface water runoff and long-term settlement/subsidence… (4) Operational environmental monitoring and surveillance: The information in this section should demonstrate how the applicant meets the environmental and surveillance requirements in 10 CFR 61.53, 10 CFR 61.41, 10 CFR 20.105, and 10 CFR 20…

**Site Closure Plan**: The applicant is required to describe the facility closure and stabilization plan and the design features intended to facilitate disposal site closure and to eliminate the need for ongoing active maintenance. Site stabilization: The applicant is required to demonstrate that disposal unit covers are designed to minimize infiltration of water into the disposal unit, to direct percolation or surface water away from disposed waste, and to resist degradation by surface geologic processes and biotic activity. Supporting information should include the results of field tests of prototype and model covers. [other areas of analysis] (a) Surface drainage and erosion protection and (b) Geotechnical stability.

**Safety Assessment:** (1) Release of radioactivity: The applicant is required to supply detailed projections of the quantities and physical, chemical, and radiological characteristics of the low-level wastes to be disposed of at the disposal facility… (2) Intruder protection: The applicant should provide information on the intruder protection measures that would be used to prevent an intruder from coming into contact with Class C waste [Class A would apply to the Envirocare facility] after the institutional control period. (3) Long-term stability: The applicant is required to present discussion, data, and stability analyses that provide reasonable assurance that there will be no need for ongoing active maintenance of the disposal site following closure. This demonstration should be based on quantitative analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over the disposal areas and adjacent soils, and surface drainage of the disposal site.

**Occupational Radiation Protection**: The applicant is required to provide information on the methods to be used for radiation protection and on estimated occupational radiation exposures to operating and construction personnel during normal operation and anticipated operational occurrences. The applicant is required to provide information on facility and equipment design, the planning and procedures programs, and the techniques and practices that will be used to meet the standards for protection against radiation of 10 CFR 20 and the guidance given in the appropriate regulatory guides, where the practices set forth in such guides will be used to implement NRC regulations.

**Financial Assurance**: The applicant is required to provide (1) sufficient information to demonstrate that its financial qualifications are adequate to carry out the activities for which the license is sought and (2) other financial assurances covered in 10 CFR 61.61 through 61.63. Requirements for funding closure and decommissioning: The applicant is required to demonstrate that the requirements in 10 CFR 61.62(a) through (g) have been met. Additionally, the party offering a guarantee must demonstrate that it has the legal authority to provide this kind of financial assurance in the State where the proposed low-level waste disposal site is located. This section should also provide an estimate of the cost of disposal site closure and stabilization in accordance with its plan for site closure. The applicant is required to identify the source or sources for the funds necessary to pay the cost of decommissioning and closing the proposed facility. The applicant is required to provide a detailed breakdown, including an explanation of assumptions used in the cost calculations.

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# Appendix C
# Pathway Analysis

The methodology used by Rogers and Associates to conduct the pathway analysis is described in the executive summary of the report, Evaluation Of The Potential Public Health Impacts Associated With Radioactive Waste Disposal At A Site Near Clive, Utah, dated June 1990.

> *"The PATHRAE computer model was used to estimate potential radiological doses to workers and the general public from radioactive waste disposal at the Clive facility. PATHRAE was developed for the EPA to assist in the development of generally applicable environmental off-site and on-site pathways through which persons may come in contact with contaminated waste materials. The off-site pathways include groundwater transport to a river or a well, surface erosion, facility overflow, and atmospheric transport. The on-site pathways include direct gamma exposure, dust inhalation, food grown on the waste site, biointrusion, and radioactive gas inhalation. For this assessment of the radiological risks from waste disposal at the Clive facility, potential exposures to on-site workers, off-site members of the general public, and post-closure site reclaimers were evaluated. Three reclaimer scenarios---intruder explorer, intruder-construction, and intruder-agriculture were modeled."*

Rogers and Associates concluded:

> *"In the vast majority of instances, when all exposure scenarios are considered, the scenario that results in the limiting radionuclide concentration is the maximum exposed off-site individual scenario. For three nuclides the limiting concentration is determined by the on-site worker scenario, and for three nuclides the limiting concentration is determined by the intruder-agriculture scenario. However, as already noted, neither the maximum off-site individual scenario nor the intruder-agriculture scenario may be realistic for the Clive facility. If these scenarios are excluded, then the on-site worker scenario becomes the limiting scenario for all radionuclides. The corresponding radionuclide concentration limits increased by factors ranging from a few percent to several orders of magnitude."*

With the exception of three radionuclides, Radium-226, Thorium-232, and Uranium-depleted, the concentration limits shown in Table V are all based upon the recommendations contained in Rogers and Associates' pathway analysis. However, concentration limits for Radium-226, Thorium-232, and Uranium-depleted all exceed the concentration limits recommended by Rogers and Associates.

**Dale Smith Consulting's Review of Rogers and Associates Pathway Analysis:** We asked Dale Smith Consulting to review the Pathway analysis conducted by Rogers and Associates to determine: (a) whether the assumptions used by Rogers and Associates appear reasonable and supportable, (b) whether the analytical methods used by Rogers conforms to conventional regulatory standards, and (c) whether the conclusions reached by Rogers and Associates regarding exposure concentrations and the effect to public safety appear reasonable. Dale Smith Consulting concluded:

> *"The basic logic of Rogers' modeling appeared reasonable. The methodology is acceptable for setting acceptable concentration of radioisotopes in waste. The conclusions reached by Rogers and Associates about concentration limits and resulting potential exposures appears reasonable."*

## Appendix D

## Concentration Levels For Radionuclides Authorized For Disposal At Envirocare

| Radioactive Isotope | Concentration Limit Picocuries Per Gram | Radioactive Isotope | Concentration Limit Picocuries Per Gram |
|---|---|---|---|
| Silver-110m | 560 | Nickel-63 | 2,000,000 |
| Americium-241 | 230 | Lead-210 | 230,000 |
| Americium-243 | 1,700 | Polonium-210 | 20,000 |
| Beryllium-7 | 38,000 | Radium-226 | 2,000 |
| Calcium-45 | 400,000,000 | Radium-228 | 1,800 |
| Cadmium-109 | 46,000 | Radium-228 1yr | 1,200 |
| Cobalt-56 | 360 | Radium-228 5yr | 670 |
| Cobalt-57 | 19,000 | Radium-228 10yr | 560 |
| Cobalt-58 | 1,600 | Ruthenium-106 | 19,000 |
| cobalt-60 | 360 | Antimony-124 | 790 |
| Chromium-51 | 68,000 | Antimony-125 | 5,300 |
| Cesium-134 | 1,200 | Tin-113 | 730,000 |
| Cesium-137 | 560 | Strontium-90 | 20,000 |
| Europium-152 | 1,700 | Thorium-230 | 15,000 |
| Europium-154 | 1,400 | Thorium-232 | 680 |
| Iron-55 | 1,800,000 | Uranium-234 | 37,000 |
| Mercury-203 | 10,000 | Uranium-235 | 770 |
| Potassium-40 | 10,000 | Uranium-238 | 36,000 |
| Iridium-192 | 2,500 | Uranium-236 | 28,000 |
| Manganese-54 | 5,600 | Uranium-natural | 18,000 |
| Niobium-94 | 160 | Uranium-depleted | 110,000 |
| Nickel-59 | 700 | Zinc-65 | 11,000 |

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## Appendix E

## Notices of Violation and Civil Penalties Issued by the DRC

| Date | Violation | Penalty |
|---|---|---|

| | | |
|---|---|---|
| 07/26/88 | Inadequate analysis of concentrations. | N/A |
| 02/17/89 | Failure to provide semiannual summary report of burial activities. | N/A |
| 09/20/89 | DRC audit found 19 license violations. | N/A |
| 12/04/89 | Improperly covered rail car. | N/A |
| 01/18/90 | Access control shed and trailer not manned, control gate unlocked and open, and staff not available to oversee operations.<br>Staff performing operational safety activities he was unqualified to conduct. | $300<br>$650 |
| 04/26/90 | Air sampling at one station discontinued. Air stations did not have detectors in place. Documentation verifying compliance with airborne sampling requirements not available. Personal airborne samples for radioactivity not taken. Dust suppression activities not performed at prescribed frequencies. Dust analysis samples not taken at prescribed frequencies. Silica monitoring not performed at regular intervals. Employees with full beards working in areas requiring respirators. Monitoring activities not performed by industrial hygienist. Licensee failed to address requirements in in regulatory guide 8.15. | $0 |
| 06/22/90 | Dust suppression techniques not performed during disposal activities. | $0 |
| 07/17/90 | Repeat violation: Failed to correctly identify and quantify unknown samples furnished by DRC. | $5,000 |

**Appendix E**
**(Continued)**

**Notices of Violation and Civil Penalties**
**Issued by the DRC**

| Date | Violation | Penalty |
|---|---|---|
| 12/04/91 | Two storage containers breached; one to the extent radioactive waste had fallen out of container onto the ground. | $2,500 |
| | Eight storage containers not water tight and approximately 13 containers not covered. | $2,500 |
| | Waste unloaded in unauthorized area. Waste transported in non-water tight containers. Waste stored in unauthorized area. | $0 |
| 03/29/91 | Backhoe working out side control area. Inspector found large quantities of radioactive material on machine. | $0 |
| 05/21/91 | Instrumentation not calibrated. | $0 |
| 08/13/91 | Debris in lift exceeded 12 inches. Debris in lift exceeded 10% by volume. | $0 |
| 02/25/92 | Results of radionuclide analysis were not received within in prescribed time limits; therefore, licensee could not demonstrate radioactive waste for disposal was within parameters authorized by the license. | $6,000 |
| | Licensee did not obtain independent outside laboratory services for analysis of samples. | $2,000 |

# Appendix F
# Acronyms and Definitions

| Acronyms | |
|---|---|
| **BRC** | Bureau of Radiation Control |
| **CFR** | Code of Federal Regulations |
| **DEQ** | Dept of Environmental Quality |
| **DRC** | Division of Radiation Control |
| **DOE** | Department of Energy |
| **DOT** | Department of Transportation |
| **DSHW** | Division of Solid and Hazardous Waste |
| **DWQ** | Division of Water Quality |
| **EPA** | Environmental Protection Agency |
| **NOD** | Notice of Deficiency |
| **NORM** | Naturally Occurring Radioactive Material |
| **NOV** | Notice of Violation |
| **NRC** | Nuclear Regulatory Commission |
| **RCRA** | Resource Conservation and Recovery Act |
| **USPCI** | United States Pollution Control, Inc. |
| **pCi/g** | Picocuries per gram |

## Definitions

**Compliance Program:** Programs developed by DRC and DSHW to ensure that disposal facilities are operating in compliance with requirements contained in their disposal license. In general, compliance programs consist of on-site visits by state inspectors to observe operations, sample shipments, and perform tests; periodic review of required records; and regularly scheduled environmental testing.

**Commercial Disposal Facility:** a facility that receives, for profit, hazardous or radioactive waste for disposal.

**Disposal:** The isolation of wastes from the biosphere inhabited by man and his food chains by emplacement in a land disposal facility.

**Disposal Cell:** A shallow landfill. Cells are excavated to depths of approximately seven to 12 feet below the surface. A liner of clay or synthetic material is placed in the bottom to prevent

radioactive or hazardous waste from escaping the cell. Waste is placed in the cell to heights of approximately 10 to 20 feet. A cover of clay or synthetic material is placed over the top of the waste to close the cell and prevent precipitation from entering the cell. A final cover of dirt and rock is placed over the cell to close the cell and prevent intrusion into the cell.

**11e(2) Material:** A byproduct or waste, as defined by the Atomic Energy Act, from ore processed for the recovery of uranium or thorium. Licensing for disposal of 11e(2) material is regulated by the NRC.

**Generator:** The producer of hazardous or radioactive wastes.

**Hazardous Waste:** a waste or combination of wastes contaminated with hazardous constituents as defined by the Resource Conservation and Recovery Act administered by the EPA (40 CFR Part 261.)

**Incinerator/Burn Plant:** A commercial disposal facility that disposes of hazardous waste through incineration.

**License:** License issued by the division in accordance with EPA or NRC guidelines. The License outlines the specific requirements for disposal with which the licensee must comply.

**Low-Level Waste:** Waste that is not defined as high-level waste, i.e., waste from nuclear reactors and/or weapons manufacturing. Low-level waste consists primarily of source, byproduct, and special nuclear material as defined in the Atomic Energy Act of 1954. NRC characterizes low-level waste into three categories: Class A, Class B, and Class C. Class A is the lowest classification and Class C is the highest.

**Mixed Waste:** Radioactive waste that also contains hazardous constituents as defined by RCRA .

**NRC Agreement State:** A state that has entered into an agreement with the NRC to administer its own radiation control program. NRC authorizes states to administer their own radiation control program provided they agree to comply with NRC guidelines with respect to source, byproduct, and special nuclear materials, as defined in the Atomic Energy Act of 1954.

**NRC Part-61:** "Licensing Requirements For Land Disposal Of Radioactive Waste." Contains the rules and regulations for location, design, operation, closure, and post-closure monitoring for radioactive waste disposal sites. Part-61 guidelines are adopted by NRC agreement states who have entered into an agreement with NRC to follow NRC guidelines in licensing radioactive disposal sites. Part-61 guidelines form the basis for the rules and regulations contained in radioactive waste disposal licenses issued by agreement states.

**Pathway Analysis:** A science based mathematical model used to estimate potential radiological doses to on-site workers and the general public from radioactive waste disposal operations. The model evaluates the "pathways" through which persons may come in contact with radioactive materials from the site: dust, groundwater, wind, vegetation, etc. Exposures to individuals were calculated based on the radioactive concentration levels of each radionuclide in the waste to proposed for disposal at Envirocare. The concentration dose results were then combined with applicable dose criteria (NRC and DOE exposure limits) to infer the proposed concentration limits for safe disposal at the site.

**PicoCurie:** A unit of measurement of radioactivity. One curie is that quantity of radioactive material which decays at the rate of 37 billion disintegrations per second. Mathematically, a PicoCurie is 1.0E-12 (one trillionth) of a curie.

**Radioactive Concentrations:** The level of radioactivity associated with a radioactive material. Higher concentration levels result in higher exposures to on-site workers, the general public, and the environment.

**Radioactive Material:** Any solid, liquid, or gaseous material which emits radiation.

**Radionuclide:** A radioactive nuclide. A nuclide is an atom characterized by the constitution of its nucleus and hence by the number of protons, the number of neutrons, and the energy content.

**Storage:** Waste waiting to be placed into permanent disposal cells. Waste in usually stored on storage pads or containers approved by DRC or DSHW.

**Surety:** A contract entered into by the licensee guaranteeing that funds will be available for closure and post-closure monitoring of a disposal site. Funds are held in the form of a bond, trust account, or other financial instrument approved by DEQ. Should the licensee fail to fulfill specified requirements of the closure/post-closure plan, DEQ is authorized to use the funds in the surety to hire an independent contractor to perform the requirements.

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# Agency Response

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